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# **AEROSPACE MEDICINE AND BIOLOGY**

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**A CONTINUING BIBLIOGRAPHY**

**WITH INDEXES**

**(Supplement 153)**

**APRIL 1976**

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**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

## **ACCESSION NUMBER RANGES**

**Accession numbers cited in this Supplement fall within the following ranges:**

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# AEROSPACE MEDICINE AND BIOLOGY

## A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 153)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in March 1976 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA)*



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# INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 175 reports, articles and other documents announced during March 1976 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, monthly supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged in two major sections—*IAA Entries* and *STAR Entries*, in that order. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes—subject and personal author—are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1976 Supplements.

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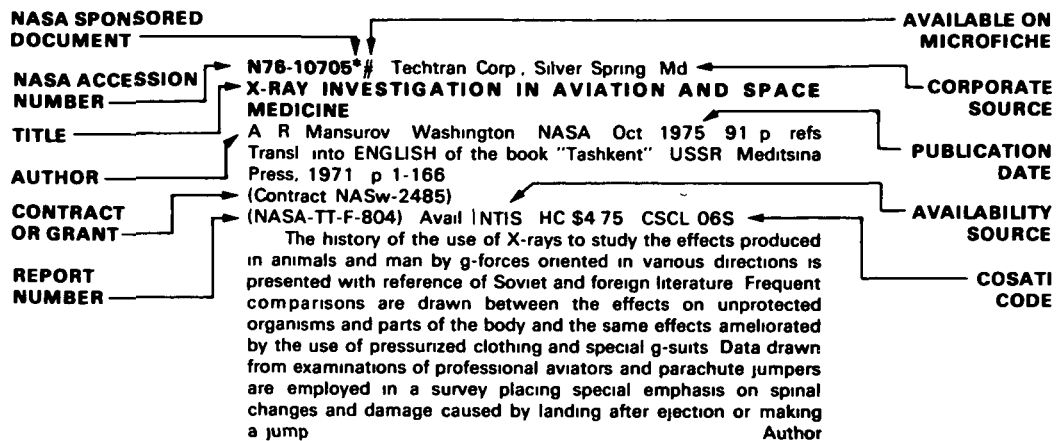
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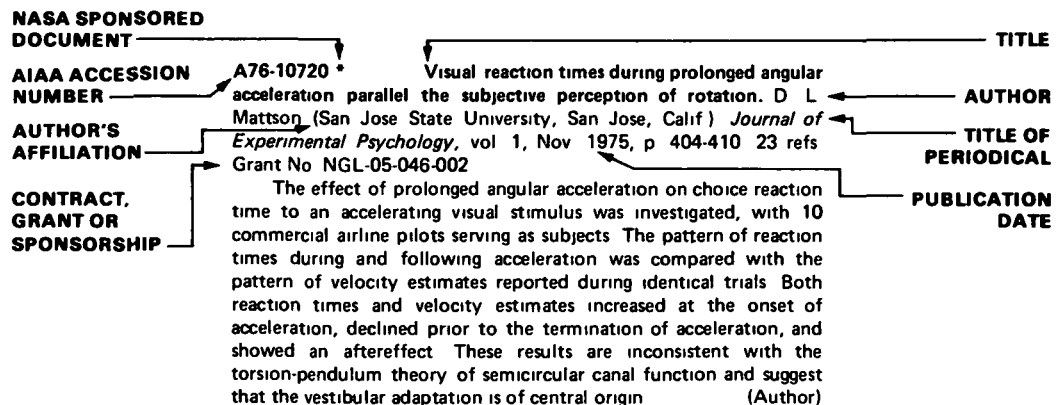
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## TYPICAL CITATION AND ABSTRACT FROM IAA



# AEROSPACE MEDICINE AND BIOLOGY

*A Continuing Bibliography (Suppl. 153)*

APRIL 1976

## IAA ENTRIES

**A76-15994** **Locus of short-term visual storage** B Sakitt (Stanford University, Stanford, Calif.) *Science*, vol 190, Dec 26, 1975, p 1318, 1319 7 refs Grant No NIH-EY-01336

A rod monochromat can preserve visual information in iconic memory even when the initial stimulus is invisible to the subject. Since the initial invisibility is due to rod saturation, it can be shown that all the information must have been stored inside the photoreceptors. Because the spectral sensitivity for producing icons in normal subjects is that of the rods, the conclusion is that in normal subjects, under ordinary viewing conditions, the photoreceptors are the primary store for iconic memory. (Author)

**A76-16423** **A reappraisal of artificial signals as an aid to a visual monitoring task** G A Murrell (Medical Research Council, Applied Psychology Unit, Cambridge, England) *Ergonomics*, vol 18, Nov 1975, p 693-700 16 refs Research supported by the Medical Research Council

Three groups of subjects performed a visual search and detection task on an inherently noisy display. One group was given 'real' signals only, in a random 10% of the trials, without knowledge of results (KOR). The second group was given 'artificial' signals, identical with the real signals, on a further 5% of the trials, increasing the apparent signal rate by 50%. The third group was similarly given artificial signals, and also immediate KOR on the trials in which artificial signals occurred. The subjects with artificial signals detected on average 75% of the real signals against 63% detected without, but also made more false alarms (22% vs 12%). This indicates a difference in response criterion even greater than normatively expected for the difference in signal probabilities, but there was no difference at all in discrimination efficiency. No benefit was conferred by KOR, probably because with variable signals no single form could be learned to serve in their discrimination. (Author)

**A76-16481\*** **Photosynthesis of organic compounds in the atmosphere of Jupiter.** J P Ferris and C T Chen (Rensselaer Polytechnic Institute, Troy, N Y) *Nature*, vol 258, Dec 18, 1975, p 587, 588 19 refs NASA-supported research

An efficient conversion of CH<sub>4</sub> to hydrocarbons and HCN takes place when NH<sub>3</sub> is photolysed in the presence of CH<sub>4</sub>, H<sub>2</sub>, and He using a 184.9 nm light source. The extent of NH<sub>3</sub> decomposition after a 1 hr exposure was determined spectrophotometrically. CH<sub>4</sub>, N<sub>2</sub>, and C<sub>2</sub> and C<sub>3</sub> hydrocarbons were detected and analyzed by mass spectrometry. Photolysis of one molar equivalent of NH<sub>3</sub> results in the loss of 0.84 molar equivalent of CH<sub>4</sub>, which apparently reacts with hot hydrogen atoms produced by photolysis. The 8% of the NH<sub>3</sub> which is not converted to N<sub>2</sub> probably is converted to organic amines and nitrile derivatives. The results indicate that NH<sub>3</sub> photolysis is a highly probable mechanism for the conversion of methane to more complex hydrocarbons in the upper atmosphere of Jupiter, and predict the occurrence of HCN, NH<sub>2</sub>NH<sub>2</sub>, and higher hydrocarbons in the Jovian atmosphere above the NH<sub>3</sub> clouds.

CKD

**A76-16776** **Comparative examinations concerning the fatty change in the liver cells of pilots** (Vergleichende Untersuchungen zur Frage der Leberzellverfettung bei Flugzeugführern) G Beckmann, M Amthor, and G Apel (Bundesministerium der Verteidigung, Flugmedizinisches Institut, Fürstentfeldbruck, München, Universität, München, West Germany) *Wehrmedizinische Monatsschrift*, vol 19, Dec 1975, p 367-371 11 refs In German

In 21 autopsies performed on pilots killed in aircraft accidents the histological examinations of the inner organs revealed, among others, a fatty degeneration of the hepatic tissue of varying degrees. These observations gave rise to discuss the question of the cause of these findings. The hepatic tissue of selected examinees consisting of unexpected fatalities - suicides and traffic fatalities - was examined as to fatty degeneration. In order to obtain analogous possibilities for comparison, only male subjects aged between 18 and 40 were considered and emphasis was placed on the case history. The fatty change in the liver cells was classified according to criteria presently applied in the pathological anatomy. The examination of liver findings in fatally crashed pilots and the results of the examination series from the civilian sector considering case history and other pathomorphological findings obtained during post-mortem examinations are discussed. (Author)

**A76-16780 #** **Variation of the bioelectrical activity of the heart in transport aviation flying personnel after low-altitude flights** (Izmeneniia bioelektricheskoi aktivnosti serdtsa u letno-pod'emnogo sostava transportnoi aviatsii posle poletoy na mal'kh vyso'takh) Iu N Karnaukhov *Voenno-Meditsinskii Zhurnal*, Sept 1975, p 64-66 In Russian

**A76-16897** **Depression of ventilation during hypoxia in man** R B Weiskopf (US Army, Research Institute of Environmental Medicine, Natick, Mass.) and R A Gabel (Peter Bent Brigham Hospital, Harvard University, Boston, Mass.) *Journal of Applied Physiology*, vol 39, Dec 1975, p 911-915 18 refs

In five normal male subjects ventilation and the partial pressures of O<sub>2</sub> and CO<sub>2</sub> in the blood were measured during the rapid progressive isocapnic production of hypoxia (5 min) and during the equally rapid, isocapnic reversal of hypoxia. At similar partial pressures of O<sub>2</sub> and CO<sub>2</sub> and similar pH, ventilation was less at a time when alveolar oxygen was increasing than when alveolar oxygen was decreasing. These results indicate that human ventilation is depressed by mild-to-moderate hypoxia (40-60 Torr), that such depression is probably central, and that it is ordinarily masked by peripheral chemoreceptor stimulation. It was not determined whether the ventilatory depression is caused by decreased partial pressure of CO<sub>2</sub> in the central chemoreceptor due to an increase in cerebral blood flow, direct hypoxic depression of the central respiratory mechanism, or both. (Author)

**A76-16898** **Effect of exercise and thermal stress on plasma volume** M H Harrison, R J Edwards, and D R Leitch (RAF, Institute of Aviation Medicine, Farnborough, Hants, England) *Journal of Applied Physiology*, vol 39, Dec 1975, p 925-931 30 refs

Six male subjects exercised for 50 min at 25% and 55% of their estimated aerobic capacities in environments of 35 C wet bulb and 24 C wet bulb, respectively. Alterations in the hematocrit, hemoglobin, and plasma protein concentrations, and in the activity of an injected aliquot of isotopically labeled albumin were used to calculate the percentage change in plasma volume occurring during exercise and recovery. Changes in each indicator were consistent with a reduction in plasma volume during exercise and a return to

preexercise levels during recovery. There was no significant difference between the indicators when exercising in the heat. During the more severe exercise in the cooler environment disproportional changes in protein, hematocrit, and hemoglobin were observed. It is concluded that exercise accelerates the rate of protein movement from extravascular compartments to the intravascular compartment, leading to elevated plasma protein levels during recovery which favor the return of water to the intravascular space (Author)

**A76-16899** Hematological alterations and response to acute hypobaric stress D Penney and M Thomas (Illinois, University, Chicago, Ill.) *Journal of Applied Physiology*, vol 39, Dec 1975, p 1034-1037 11 refs Grant No PHS-HL-16367-01

Exposure of rats to simulated altitude (15,000 ft) for 1 day and 3 and 9 weeks produced progressive polycythemia, elevated 2,3-diphosphoglycerate (2,3 DPG) levels and raised hemoglobin saturation values, the latter two parameters decreased toward control values after 9 weeks. Carbon monoxide (38-43% HbCO) exposure produced polycythemia after 3- and 9-weeks exposure, no change in 2,3-DPG and a fall in the hemoglobin saturation value. Ten days' treatment with sodium cyanate produced a large decrease in 2,3-DPG and hemoglobin saturation value. Survival during 90 min of acute hypobaria (0.3 atm) under Nembutal anesthesia was highest with NaOCN (75%), intermediate with 3- and 9-weeks exposure to altitude and CO (56-58%), lower in 1-day altitude exposure (44%) and lowest in controls (5%). Heart and ventilation rate was monitored during this hypobaric test and response patterns established for each exposure/treatment (Author)

**A76-16905** # The role of dominant hemisphere in the regulation of emotional states (O roli dominantnogo polushariia v reguliatsii emotsional'nykh sostoianii) V L Deglin and N N Nikolaenko (Akademiia Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR) *Fiziologiya Cheloveka*, vol 1, May-June 1975, p 418-426 23 refs In Russian

Experiments were conducted to compare variation of emotional state and EEG during the post-seizure period of 40 right-handed psychotics subjected to electroconvulsion therapy by unilateral seizures induced by unilateral electrical stimulation. It is found that a unilateral seizure is followed by interhemispheric asymmetry of the EEG dominance of delta rhythm in the stimulated hemisphere and of alpha rhythm in the intact hemisphere. Results also indicate that a unilateral seizure is followed by emotional changes: improvement in the state of mind after right-side seizures and its degradation after left-side seizures. A statistical analysis shows that the emotional changes correlate primarily with changes in the EEG of the left hemisphere. A major conclusion is that left dominant hemisphere plays an important part in the regulation of human emotional states due to selective activation of thalamocortical structures in the dominant hemisphere S D

**A76-16906** # Psychophysiological investigation of group interaction (Psikhofiziologicheskoe izuchenie gruppovogo vzaimodeistviia) M A Novikov (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) *Fiziologiya Cheloveka*, vol 1, May-June 1975, p 440-450 22 refs In Russian

The investigation of psychophysiological responses in individuals involved in group activity becomes of particular importance in the case of autonomous activity of small human groups. Two experimental techniques are discussed: word association test in pairs and group interaction test with a homeostatic device. Experimental results indicate that there are distinct differences in trend and markedness of the observed psychophysiological responses, depending on the functional role played by an individual in the group activity. It is shown that stress affects an individual most deeply only when he assumes leadership responsibility for the group as a whole, striving to realize the group aims rather than his personal achieve-

ments. The logical structure of human emotional stress response represented by factor-organism should evidently include the following links: situation, personality, and social group. S D

**A76-16907** # Man in the state of operational stress (Chelovek v sostoianii opsatsional'nogo stressa) K A Ivanov-Muromskii and O N Luk'ianova (Akademiia Nauk Ukrainnoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR) *Fiziologiya Cheloveka*, vol 1, May-June 1975, p 459-468, 26 refs In Russian.

The paper investigates the activity and functional state of individuals under conditions of operational stress induced by time deficit in carrying out a number of algebraic operations. Best results are obtained by the testees characterized by a high lability of nerve processes. In the case where the operation is carried out under conditions of sound noise, selection of operator requires an individual with a high lability and with a high-intensity nervous system with respect to stimulation. Human stress condition is shown to entail changes in functional state, which is reflected in a substantial change in the parameters of different systems in the human body. S D

**A76-16908** # Differential adaptivity of the brain (Differentsial'naya adaptivnost' mozga) N N Vasilevskii (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) *Fiziologiya Cheloveka*, vol 1, May-June 1975, p 469-481 19 refs In Russian

The development of investigations regarding the problem of individual typological differentiation of man points to a need for new approaches taking into account the neurophysiological criteria that characterize the general and individual features pertaining to the regulation of the functional state of the human brain. This functional state serves as a background for the specific activity of a human operator in a man/machine system. Statistical evaluation of the performance quality is discussed along with the heart rate, the EMG of cervical muscles as an index of psychophysiological stress, and the EEG used in identifying the adaptive self-regulation characteristics for the functional state of the human brain. An analysis of the structure of motor skills and the duration of autonomic nervous system responses to the complexity of the formulated problems made it possible to reveal two groups of operators with a high and a low level of adaptivity. S D

**A76-16909** # Role of biological macrorhythms in the regulation of sleep (Rol' biologicheskikh makroritmov v reguliatsii protsessa sna) N I Moiseeva, M Iu Simonov, and N V Tonkova (Akademiia Meditsinskikh Nauk SSSR, Ministerstvo Zdravookhraneniia SSSR, Leningradskii Meditsinskii Institut, Leningrad, USSR) *Fiziologiya Cheloveka*, vol 1, May-June 1975, p 482-488 30 refs In Russian

Results of numerous tests on the brain biopotentials in 25 subjects during natural sleep overnight are compared successively with the phases of the macrorhythms of physical, emotional, and intellectual activity. In addition, an analysis is carried out of the sleeping regime records in which factors affecting the individual's sleep are noted. Results indicate that the criteria of sleep vary as a function of the dynamics of the phases of different macrorhythms. It is suggested that the behavior of the biological clocks determining the trend of sleeping rhythm may be modulated by means of biological rhythms of multi-diurnal period. Stress situations inducing hormonal and autonomic changes cause an increase in the duration of sleep which tends to stabilize during its course. S D

**A76-16910** # The waveform of diurnal rhythm (O forme volnoi sutochnogo ritma) K M Smirnov, I P Emel'ianov, V M Koroleva-Munts, and S O Ruttenburg (Vsesoiuznyi Tsentral'nyi Sovet Professional'nykh Soiuзов, Vsesoiuznyi Nauchno-Issledovatel'skii Institut Okhrany Truda, Leningrad, USSR) *Fiziologiya Cheloveka*, vol 1, May-June 1975, p 489-492 18 refs In Russian

The paper investigates the characteristics of the waveform of the diurnal rhythm in subjects aged 26-44 for varying body temperatures and heart rates. The results obtained are presented in the form of averaged group chronograms which are further processed by the method of least squares in order to derive the sinusoids that best characterize the measurement results. The confidence intervals of these sinusoids are also determined. The resulting waveform is suggested to be attributed to the synchronization effects of the rhythm of alternating sleep and arousal. S D

**A76-16911 #** Voluntary control of the number of discharges of a single spinal alpha neuron (Proizvol'noe upravlenie chislom razriadov ot del'nogo spinal'nogo al'fa-motoneirona). Iu. T. Shapkov (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR) *Fiziologiya Cheloveka*, vol 1, May-June 1975, p 493-502. 15 refs. In Russian.

Experiments were conducted to study the modes of voluntary control of the discharges of motor units in man. The analysis employs a model based on the human capacity to generate one, two, or three discharges of motor unit according to the instructions received. It is shown that this sensorimotor skill is achieved only in the presence of a feedback signal. The organization of voluntary control of the number of discharges of motor unit is regarded as the cortical activation of an alpha neuron, which upon completion of the prescribed number of discharges is followed by supraspinal inhibition. S D.

**A76-16912 #** Artificial stable functional connections as a means of forming long-term memory matrices in man /Contribution to long-term memory theory/ (Artifitsial'nye stabil'nye funktsional'nye svyazi kak sposob formirovaniia matrits dolgoosrochnoi pamiatu u cheloveka /K teorii dolgoosrochnoi pamiatu/). V. M. Smirnov and Iu. S. Borodkin (Akademiia Meditsinskikh Nauk SSSR, Leningrad, USSR) *Fiziologiya Cheloveka*, vol 1, May-June 1975, p 525-533. 29 refs. In Russian.

**A76-16913 #** Changes in thermal regulation during physical loads of various intensity (Sdviigi termoregulatsii pri fizicheskikh nagruzkakh raznoi intensivnosti). V. A. Bernshtein, M. M. Sinaiskii, and V. G. Fedotova (Smolenskii Institut Fizkul'tury, Smolensk, USSR) *Fiziologiya Cheloveka*, vol 1, May-June 1975, p 549-554. 10 refs. In Russian.

A total of seven athletes exercising on a bicycle ergometer were tested at different levels of exerted power equivalent to 30%, 50%, and 70% of the maximum oxygen consumption (MOC) of the testees. Major conclusions are that increase in body temperature is dependent on the dissipated power level and that changes in body temperature are of three-phase character, i.e., no substantial change, sharp increase, stabilization at new level for 30% and 50% MOC or relatively slow rise for 70% MOC. The effect of perspiration on body temperature rise and body weight loss is examined. S D.

**A76-17007 #** The problem of the existence of life in the solar system outside of the earth. I (Zagadnienie wystepowania zycia w ukkladzie slonecznym poza ziemia I). O. Wolczek (Polskie Towarzystwo Astronautyczne, Warsaw, Poland) (*Polskie Towarzystwo Astronautyczne, Konferencja Naukowa Poswiecona Zagadnieniom Egzobiologii oraz Obszczym Cywilizacji Technicznych i Możliwości Nawiazania Łączności z Nimi, Katowice, Poland, Apr 21, 1975*) *Postępy Astronautyki*, vol 8, no 2, 1975, p 7-49. 160 refs. In Polish.

A review article on research and observations on conditions favoring or inhibiting abiogenic creation of organic compounds on the planets and lesser bodies of the solar system. Temperature variations (diurnal and seasonal, if any), gravitational and magnetic fields, atmospheric pressure, elements present or absent, water present in any form or amount, impacting of meteorites, and the structure of the crust are considered, in addition to spectroscopic and radar data, the greenhouse effect where applicable, and results of laboratory culturing of micro-organisms under severe conditions.

Mars, Venus, Jupiter, Saturn, and the Jovian moon Io are considered favorable to abiogenic creation, while the Saturnian moon Titan is also viewed as a favorable site for the survival of more complex organic compounds. R D V

**A76-17010 #** Investigation of normalization of responses of the circulatory system disturbed by accelerations (Badania normalizacji odczynow ukkladu krążenia zaburzonych działaniem przyspieszen). J. Domaszuk and M. Wojtkowiak (Wojskowy Instytut Medycyny Lotniczej, Warsaw, Poland) *Postępy Astronautyki*, vol 8, no 2, 1975, p 83-91. In Polish.

Blood-reservoir organs (brain, kidneys, spleen, liver) of 50 guinea pigs subjected to plus and minus accelerations in a centrifuge were analyzed to find the organs' response to and recovery from sudden accelerations. Radioisotope-tagged tissues of animals sacrificed before and after accelerations were tested. Normal blood flow to the organs was restored within 5-15 min after acceleration, but severe brain hyperaemia and ischaemia of the liver, spleen, and kidneys resulted from extreme accelerations and persisted till 30 min after acceleration was terminated. R D V

**A76-17120** Release of adenosine by hypoxic canine lung tissue and its possible role in pulmonary circulation. R. M. Mentzer, Jr., R. Rubio, and R. M. Berne (Virginia University, Charlottesville, Va.) *American Journal of Physiology*, vol 229, Dec 1975, p 1625-1631. 18 refs. Grants No. NIH-HL-10384, No. NIH-GM-02020.

Adenosine levels (nmol/g tissue) in lung in six dogs ventilated with 95% N<sub>2</sub> and 5% CO<sub>2</sub> for a period of 3 min increased nearly 10-fold. Inosine and hypoxanthine, adenosine enzymatic degradation products, sustained a 10- and 7-fold increase, respectively. These degradative products are mainly formed in the capillary endothelial cells that contain the degradative enzyme nucleoside phosphorylase as demonstrated by histochemical techniques. To determine the effect of ATP, ADP, AMP, and adenosine on the pulmonary circulation, the in situ left lower lobe of 10 dogs were perfused at either free flow or constant flow via its pulmonary artery. ATP and ADP increased lobar vascular resistance, AMP and adenosine decreased the resistance. During hypoxic ventilation, adenosine infusions (100 nmol/ml blood) entirely abolished the increase in vascular resistance that was due solely to hypoxia. Dipyridamole produced similar responses. These data indicate that adenosine is a pulmonary vasodilator and that it may modulate the pulmonary pressor response to acute alveolar hypoxia. (Author)

**A76-17123** Body position, electrode level, and respiration effects on the Frank lead electrocardiogram. H. Riekkinen (Dalhousie University, Halifax, Nova Scotia, Canada) and P. Rautaharju (Helsinki, University, First Medical Clinic, Helsinki, Finland) *Circulation*, vol 53, Jan 1976, p 40-45. 18 refs. Research supported by the Nova Scotia Heart Foundation, Medical Research Council of Canada Grant No. MT-2228.

**A76-17124** Complication rate of coronary arteriography - A review of 5250 cases studied by a percutaneous femoral technique. M. G. Bourassa (Montreal Heart Institute, Montreal, Canada) and J. Noble (Montreal, University, Montreal, Canada) *Circulation*, vol 53, Jan 1976, p 106-114. 37 refs. Research supported by the Jean-Louis Levesque Foundation.

A very large number of patients (5250) underwent coronary arteriography in our laboratory by a percutaneous femoral technique with preformed polyethylene catheters and no systemic heparinization. Data were recorded during and for 24 hours postcatheterization. The annual mortality rate averaged 0.23% and remained relatively stable. Incidence of embolic complications was very low. In patients with normal coronary arteries, no fatal or serious nonfatal complications occurred. Left main coronary artery disease was present in all cases of mortality, and at least 60% stenosis was shown in nine of 12 instances. Thus major risk was proportional to the

severity of disease in the left coronary system. The use of more aggressive supportive measures in these high-risk cases appears essential to reduce the total complication rate from coronary arteriography significantly (Author)

**A76-17125** The displacement cardiograph - A noninvasive technique for recording myocardial wall motion. T. C. Gay, R. Vas, D. E. Pittman, and C. R. Joyner (Pittsburgh, University, Allegheny General Hospital, Carnegie-Mellon University, Pittsburgh, Pa.) *Circulation*, vol. 53, Jan. 1976, p. 139-143. 19 refs.

The displacement cardiograph (DCG) is a noninvasive device employing an electromagnetic field to record tissue motion within the body. Disturbances in the field which result from ventricular wall motion are electronically converted to an analog output and a pattern inscribed on the paper of a physiological recorder. In order to determine the reliability of the DCG in detecting regional areas of abnormal left ventricular wall motion, displacement cardiograms were obtained from 70 patients who underwent cardiac catheterization and left ventriculography. The DCG interpretations were in agreement with the ventriculographic picture of left ventricular wall motion in 67 of the 70 patients. There were two false positive and one false negative DCG diagnoses. The results indicate that the DCG can be employed as a reliable noninvasive method for repetitive assessment of the pattern of contraction of the anterior, anterolateral and posterior left ventricular wall (Author)

**A76-17481** # The processing of acoustic signals in organic systems (Die Verarbeitung akustischer Signale in organischen Systemen). M. Schonfeld (Dresden, Technische Universität, Dresden, East Germany) *Wissenschaftliche Zeitschrift*, vol. 24, no. 3-4, 1975, p. 597-600. 9 refs. In German.

The current state of knowledge concerning the physiological aspects involved in the functioning of organic auditory systems is examined, taking into account the various parts of the auditory system of mammals and a model regarding the signal processing operations involved. It is pointed out that an explanation of acoustic sensation and perception on the basis of physiological signal processing principles would be a first in the study of organic recognition processes. Attention is given to the possibility to develop a general model of organic language recognitions for the verification of a hierarchic feature identification and classification. G. R.

**A76-17518** # The physiological experiment aboard the biosatellite Kosmos-605 (Fiziologicheskii eksperiment na biosputnike 'Kosmos-605'). O. G. Gazenko, B. A. Adamovich, and E. A. Il'in. *Akademiia Nauk SSSR, Vestnik*, no. 9, 1975, p. 62-70. In Russian.

The physiological, morphological, and biochemical effects of prolonged weightlessness and the dynamics of readaptation to normal gravity were studied in a group of white mice after a 22-day flight aboard the biosatellite Kosmos-605. Morphological studies immediately after flight revealed changes in the hypothalamo-hypophyseal system, adrenal glands, and thyroid. The concentration of leucocytes in the peripheral blood was increased, and a decrease in the number of lymphocytes in the blood was noted. Biochemical analyses showed alterations in the activities of creatinphosphokinase, aspartaminotransferase, and certain other enzymes within the limits of ordinary physiological fluctuations. The concentration of lactic acid was decreased. The most extensive histological changes were found in the lymphatic system. Most of these post-flight effects were temporary, disappearing completely within 26 days after flight.

C. K. D.

**A76-17664** # Regulation of local tissue oxygen pressure in the brain cortex of the cat (Regulatsiia mestnogo tkanevogo PO<sub>2</sub> v kore mozga koshki). E. Leniger-Follert, D. W. Lubbers, and W. Wrabetz (Max-Planck-Institut für Systemphysiologie, Dortmund, West Germany) *Fiziologicheskii Zhurnal SSSR*, vol. 61, Oct. 1975, p. 1513-1517. 10 refs. In Russian.

**A76-17665** # Influence of the hypothalamus and reticular formation on the brain cortex during cerebral hypoxia (Vlianie gipotalamusa i retikuliarnoi formatsii na kory bol'shikh polusharii pri gipoksicheskikh sostoianiakh mozga). V. V. Suchkov (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) *Fiziologicheskii Zhurnal SSSR*, vol. 61, Oct. 1975, p. 1524-1530. 36 refs. In Russian.

**A76-17671** # Fluorescent angiography in the presence of congested and pseudocongested discs of ocular nerves (Fluorescentnaya angiografiia pri zastoinykh i psevdozastoinykh diskakh zritel'nykh nervov). N. P. Pureskin. *Voenno-Meditsinskii Zhurnal*, Oct. 1975, p. 35-38. In Russian.

The usefulness of fluorescent angiograms as a diagnostic tool for congestive and inflammatory edema, pseudoedema, and partial atrophy of ocular nerves is assessed. Fluorescent angiograms were performed on a group of 34 patients with previously diagnosed conditions and a control of 9 healthy persons. Results indicate that the technique has little potential for the differential diagnosis of inflammatory and congestive edema of the disc of ocular nerves. However, it is possible to clearly differentiate between true and false edema, and the method permits the precise and objective determination of atrophied sectors producing defects in the field of vision.

C. K. D.

**A76-17672** # The effect of vibration and noise on the function of endocrine glands in military technical crews (Vlianie vibratsii i shuma na funktsiiu zhelez vnutrennei sekretsii u ekipazhei voennoi tekhniki). D. Ia. Shurygin, P. O. Viazitskii, and I. D. Kudrin. *Voenno-Meditsinskii Zhurnal*, Oct. 1975, p. 50-52. In Russian.

A group of healthy men was periodically exposed to low-frequency (up to 8 GHz) vibration, vibrational amplitudes from 150 to 200 mm, loads from 0.1 to 7 g, and a noise level of 90 dB over three days. Extensive blood and urine analyses were carried out before and after the experiment to determine changes in the levels of indicator substances of the endocrine system. A regular decrease was found in the amount of noradrenalin excreted (from 39.8 mg/kg/day to 10.5 mg/kg/day mean levels), together with a corresponding increase in excreted adrenalin (from 1.6 to 11.2 mg/kg/day). The concentration of sodium ions in the blood decreased parallel to a significant rise in the amount of sodium excreted, indicating a lowered level of mineralo-corticosteroid activity in the adrenal gland. An increase in the amount of somatotrophic hormone in the blood was observed. The observed changes persisted for three to five days.

C. K. D.

**A76-17673** # Medico-technical provisions for the interaction of man with military technology (Mediko-tekhnicheskoe obespechenie vzaimodeistviia cheloveka s voennoi tekhnikai). N. M. Rudnyi and V. A. Ponomarenko. *Voenno-Meditsinskii Zhurnal*, Oct. 1975, p. 58-61. In Russian.

Factors affecting the successful design of military man-machine systems are discussed. The importance of cooperative planning involving teams of physicians, engineers, and technicians based on a detailed analysis of physical, psychological, and environmental stress factors present under operational conditions is stressed. Such an analysis is summarized for a pilot-plane-environment system.

C. K. D.

**A76-17674** # The role of physical preparation in the flight training process (Rol' fizicheskoi podgotovki v protsesse letnogo obucheniia). R. N. Makarov. *Voenno-Meditsinskii Zhurnal*, Oct. 1975, p. 61-64. In Russian.

Two groups of men were subjected to different regimes of physical preparation prior to flight training. The control group underwent the standard course of physical training in use by the Soviet Air Force, consisting of intensive exercise designed to rapidly increase endurance and overall fitness. The intensity of the physical preparation was sharply decreased during the phase immediately prior to flight training, and gradually increased during the period of flight training. In the experimental group additional emphasis was placed on developing ability to react quickly and accurately in

situations requiring divided attention and on enhancing spatial orientation. In addition to calisthenics, this group was exposed to sports such as handball, basketball, and tennis, and to gymnastics. The maximum intensity was reached during the period prior to flight training, during flight training the amount of time devoted to physical training decreased. The experimental group performed better during flight training and in physical and psychological tests  
C K D

**A76-17675 #** Hyperbilirubinemia in air crews (Giperbilirubinemi u letnogo sostava) I L Anikin *Voenna-Meditsinskii Zhurnal*, Oct. 1975, p 73, 74. In Russian

Blood serum analyses were carried out on a group of 625 members of air crews to determine the incidence of hyperbilirubinemia. Results indicated hyperbilirubinemia in 13.7% of the cases studied. Of this total, 8.9% of the cases were diagnosed as transitory, 3.3% as functional hyperbilirubinemia, and 1.4% as chronic hepatitis, with combined bilirubin contents of above 1 mg %, 1.26 to 2.52 mg %, and 1.47 to 2.94 mg %, respectively, in comparison with the normal mean value of 0.38 to 0.68 mg %. Guidelines for differential diagnosis of the various forms of hyperbilirubinemia are discussed  
C K D

**A76-17718 #** Design of manipulator system movements (K postroeniui dvizhenii manipulyatsionnykh sistem) A A Kobrinskii and A E Kobrinskii (Gosudarstvennyi Nauchno-Issledovatel'skii Institut Mashinovedeniia, Moscow, USSR) *Akademiia Nauk SSSR, Doklady*, vol 224, Oct 11, 1975, p 1030-1033. 6 refs. In Russian

The paper deals with the problem of reducing the redundancy of manipulator systems, with redundancy in this case meaning the large number of movement levels of the operating organs (mechanical arms) of the manipulator. Design of the movements of a manipulator refers to an algorithm which permits the computation of variation laws for the generalized coordinates of the manipulator system. This permits the development of a criteria for minimal movement redundancy  
B J

**A76-17727 #** Plotting the movements of a manipulating system in a medium with obstacles (Postroenie dvizhenii manipulyatsionnoi sistemy v srede s prepiatsviiami) A A Kobrinskii and A E Kobrinskii (Gosudarstvennyi Nauchno-Issledovatel'skii Institut Mashinovedeniia, Moscow, USSR) *Akademiia Nauk SSSR, Doklady*, vol 224, Oct 21, 1975, p 1279-1282. In Russian

The problem of the motion of a manipulator consisting of an n-link kinematic chain with tong, moving according to a given law, is studied for the case when some fixed geometrical object D is present in the working space of the manipulator. Positions of the kinematic chain in which its links have points in common with the obstacle are forbidden. It is required to construct in the configuration space of the system a series of manipulator configurations, within the constraints imposed by the obstacle, for which the tong occupies given positions in succession. An algorithm is constructed for solving this problem on the principle of tropism  
P T H

**A76-17875 \*** The non-visual in visual accommodation. R J Randle (NASA, Ames Research Center, Moffett Field, Calif) *Institute of Electrical and Electronics Engineers, International Conference on Cybernetics and Society, San Francisco, Calif, Sept 23-25, 1975, Paper. 5* p 16 refs

Many factors other than retinal image defocus have been found to influence the visual accommodation response. Experimental results reported herein demonstrate the effect on accommodation of four factors that previously have been only tangentially discussed in other research or have not been stated specifically to exist (Author)

**A76-17892** Concept of algorithmic control for one class of large systems. M Vukobratovic (*Avtomatika i Telemekhanika*, July 1975, p 83-100) *Automation and Remote Control*, vol 36, no 7, Dec 20, 1975, pt 2, p 1125-1140. 14 refs. Translation. Research supported by the Matematichki Institut of Belgrade

**A76-17896 \*** Effect of fluorocarbons on acetylcholinesterase activity and some counter measures. W Young and J A Parker (NASA, Ames Research Center, Moffett Field, Calif) *Journal of Fire and Flammability, Combustion Toxicology Supplement*, vol 2, Nov 1975, p 286-297. 11 refs

An isolated vagal sympathetic heart system has been successfully used for the study of the effect of fluorocarbons (FCs) on cardiac performance and in situ enzyme activity. Dichlorodifluoromethane sensitizes this preparation to sympathetic stimulation and to exogenous epinephrine challenge. Partial and complete A-V block and even cardiac arrest have been induced by epinephrine challenge in the FC sensitized heart. Potassium chloride alone restores the rhythmicity but not the normal contractility of the heart in such a situation. Addition of glucose will, however, completely restore the normal function of the heart which is sensitized by dichlorodifluoromethane. The ED 50 values of acetylcholinesterase activity which are used as a measure of relative effectiveness of fluorocarbons are compared with the maximum permissible concentration. Kinetic studies indicate that all the fluorocarbons tested so far are noncompetitive (Author)

**A76-17897 \*** Evaluation of the NASA animal exposure chamber as a potential chamber for fire toxicity screening tests. C J Hilado (San Francisco, University, San Francisco, Calif) *Journal of Fire and Flammability, Combustion Toxicology Supplement*, vol 2, Nov 1975, p 298-314. 30 refs. Grant No. NSG-2039

A standard animal exposure chamber designed and patented by NASA has been extensively used for long-term animal exposure studies. Preliminary evaluation of the NASA chamber in pyrolysis tests indicates that this apparatus with minor modification is useful for short-term acute toxicity tests of the type used in laboratory screening test methods. With hyperthermia and hypoxia excluded as significant factors, pyrolysis toxicity tests gave standard deviations as low as 3 percent in the time-to-death response. The materials tested were red oak, plywood, polybenzimidazole fabric, and flexible polyurethane foam. The strain of laboratory animal appeared to be a factor affecting test results (Author)

**A76-17898** A bibliography of published information on combustion toxicology. C J Hilado (San Francisco, University, San Francisco, Calif) and L A LaBossiere (Boston College, Chestnut Hill, Mass) *Journal of Fire and Flammability, Combustion Toxicology Supplement*, vol 2, Nov 1975, p 315-323. 122 refs

**A76-18075** Engineering anthropometry methods. J A Roebuck, Jr. (Rockwell International Corp., Downey, Calif), K H E. Kroemer (Federal Institute for Occupational Safety and Accident Research, Dortmund, West Germany), and W G Thomson (U.S. Naval Material Command, Naval Undersea Research and Development Center, San Diego, Calif) New York, Wiley-Interscience, 1975. 473 p. \$45. 545 refs. \$27.95.

The present work deals with historical material, descriptions of measurement techniques, and explanations of methodology, abstracted and developed from a wide variety of reports on special anthropometric studies and applications carried out in research institutes and engineering departments in the United States and many other countries. Studies by manufacturers of airframes, spacecraft, automobiles, and industrial equipment and furniture have greatly contributed to the development of adequate data and

application techniques. The discussion covers methods for static anthropometric measurements, measurement of dynamic characteristics and movement, measurement of muscular strength capabilities, biometric relationships, applications methodology, work space design applications, clothing design applications, controls, devices, and components design applications. Statistical aspects of planning for anthropometric surveys are discussed. General rules of thumb concerning body proportional relationships and population characteristics are examined. An extensive bibliography and a glossary of technical terms are provided. S D

**A76-18290 # Limits concerning sensorial information processing in man (Grenzen der sensorischen Informationsverarbeitung des Menschen).** M Spreng (Erlangen-Nürnberg, Universität, Erlangen, West Germany) *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, 8th, Bonn, West Germany, Sept. 16-18, 1975, Paper 75-025* 22 p. 18 refs. In German

It is pointed out that the majority of the existing data concerning the limits of the sensory perception capabilities of man have been determined on the basis of subjective-comparing statements of subjects. The possibility to supplement these data with test results which include objective electrophysiological measurements is considered and an example is presented for the good correlation between subjective and objective investigations. The suitability of a use of evoked potentials for the objective study of human information-processing procedures and their limits is discussed. G R

**A76-18291 # Stress in the case of air traffic control personnel /taking into consideration future systems/ (Beanspruchung des Flugverkehr-Kontrollpersonals /unter Berücksichtigung künftiger Systeme/)** W Rohmert (Darmstadt, Technische Hochschule, Darmstadt, West Germany) *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, 8th, Bonn, West Germany, Sept. 16-18, 1975, Paper 75-026* 10 p. 7 refs. In German

The activities of persons engaged in air traffic control operations are examined and the stresses produced by these activities are analyzed. The investigation makes use of an approach of activity analysis developed by Rohmert et al (1975). Results of a quantitative study of problem difficulty are discussed along with possible changes of stress conditions which occur as a result of the introduction of new systems. Attention is given to the results of stress measurements based on the observation of electrophysiological parameters. The described approach makes it possible to predict the stress corresponding to certain operational conditions. G R

**A76-18292 # Acceleration tolerance of man as limiting factor in manned aeronautics (Die Beschleunigungstoleranz des Menschen als begrenzender Faktor in der bemannten Luftfahrt).** L H Vogt (Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Institut für Flugmedizin, Bonn, West Germany) *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, 8th, Bonn, West Germany, Sept. 16-18, 1975, Paper 75-027* 19 p. 20 refs. In German

A survey is presented of problems which are related to the ability of man to tolerate long-term conditions of high acceleration which can exist in modern military aircraft. Physiological and pathophysiological changes which occur in the human body as a consequence of high acceleration are considered along with methods which enhance the acceleration tolerance of the flying personnel. It appears that, in connection with an employment of these methods, perfusion and ventilation conditions with respect to the lungs have become the critical factor which determines the limit of human acceleration tolerance. G R

**A76-18293 \* # Physiological and psychological stress limits for astronauts - Observations during the Skylab I-III missions (Physiologische und psychologische Belastungsgrenzen für die Raumfahrt Erfahrungen der Skylab I-III Missionen).** E C Burchard (NASA, Johnson Space Center, Houston, Tex., Bundesministerium der Verteidigung Flugmedizinisches Institut, Fürstentfeldbruck, West Germany) *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, 8th, Bonn, West Germany, Sept. 16-18, 1975, Paper 75-028* 12 p. In German

The physiological and psychological factors of manned space flight had a particular significance in the Skylab missions during which astronauts were subjected to a life in a space environment for longer periods of time than on previous space missions. The Skylab missions demonstrated again the great adaptability of human physiology to the environment of man. The results of Skylab have indicated also approaches for enhancing the capability of man to tolerate the physiological and psychological stresses of space flight. G R

**A76-18297 # Electrophoresis experiment for ASTP as predecessor of biomedical Spacelab experiments (Elektrophorese-Experiment für ASTP als Vorläufer biomedizinischer Spacelab-Experimente).** E Schoen (Messerschmitt-Bolkow-Blohm GmbH, Munich, West Germany) *Deutsche Gesellschaft für Luft- und Raumfahrt, Jahrestagung, 8th, Bonn, West Germany, Sept. 16-18, 1975, Paper 75-035* 37 p. In German

The experiment considered is one of 17 scientific experiments which was selected for the Apollo-Soyuz Test Project (ASTP). The scientific principles of electrophoresis are considered along with the significance of analytic separation procedures based on electrophoresis. A conduction of electrophoretic experiments in space makes it possible to eliminate disturbing effects related to buoyancy and thermal convection. A preliminary evaluation of the results obtained in the ASTP experiment shows that a ten-fold enhancement of the performance of electrophoretic procedures is possible in the absence of gravity. G R

**A76-18378 \* Noise and sleep - A literature review and a proposed criterion for assessing effect.** J S Lukas (Stanford Research Institute, Menlo Park, Calif.) *Acoustical Society of America, Journal*, vol. 58, Dec. 1975, p. 1232-1242. 56 refs. NASA-supported research, U.S. Environmental Protection Agency Contract No. 68-01-3120

Results of a number of studies on the effects of various types of noise on the sleep of subjects of both sexes and a wide range of age groups are reviewed to develop a tentative criterion for assessing these effects. Available data suggest that reasonably accurate predictions of sleep disruption may be made if the interfering noise is specified in units (EPNdB or EdBA) which account for its spectral characteristics and duration. When EPNdB units are used as the measure of noise intensity, the correlation coefficient between intensity and the probability of no sleep disturbance is -0.86. Because of the paucity of data on the long-term results of frequent behavioral wakings or arousals, it is suggested that disturbance of sleep be defined as an electroencephalographic change of one or more sleep stages. C K D

**A76-18380 Problems in echocardiographic volume determinations - Echocardiographic-angiographic correlations in the presence or absence of asynergy.** L E Teichholz, M V Herman, R Gorlin (Mount Sinai Hospital, New York, City University, New York, N.Y.), and T Kreulen (Temple University, Philadelphia, Pa.) *American Journal of Cardiology*, vol. 37, Jan. 1976, p. 7-11. 16 refs. Grant No. PHS-P01-11306

Experiments were conducted to verify the validity of the assumption of taking the major axis of the left ventricle to be twice as long as the minor axis in the calculation of left ventricular volumes by echocardiography and to determine the accuracy and usefulness



of ultrasound in calculating left ventricular volumes in patients with and without asynergy (abnormal wall motion) of the left ventricle. A theoretically correct equation for determining ventricular volume by echocardiography is obtained from both end-systolic and end-diastolic data, so that its application should be correct regardless of timing in the cardiac cycle. It is shown that the ability to use echocardiographically determined volumes to predict the angiographic volumes in patients with left ventricular asynergy is limited, in contrast to its effective use in patients without left ventricular asynergy S D

**A76-18381** Upsloping S-T segments in exercise stress testing - Six year follow-up study of 438 patients and correlation with 248 angiograms. R J Stuart, Jr and M H Ellestad (Memorial Hospital Medical Center, Long Beach, Calif.) *American Journal of Cardiology*, vol 37, Jan 1976, p. 19-22 17 refs Research supported by the Long Beach Heart Association and Memorial and Children's Medical Center Foundation

Results are presented on a six-year follow-up study of 438 patients subjected to maximal treadmill stress testing in order to determine the relative significance of exercise-induced S-T depression manifested as upsloping, horizontal, or downsloping. Ninety percent of the patients were tested for evaluation of known or suspected angina pectoris and 10 percent for screening for a physical fitness program. Results indicate that in patients with a downsloping S-T segment the incidence rate of coronary events was 13% per year, horizontal S-T patterns were associated with a coronary event rate of 9%, and upsloping S-T patterns of at least 2 mm depression were associated with a coronary event rate of 9% per year. Coronary event incidence rate in death cases is discussed. The S-T segment is compared with coronary angiograms. It is concluded that when S-T depression is more than 2 mm 0.08 sec after the J junction, it is associated with a prognosis and incidence of two or three vessel major coronary disease similar to that of the classical ischemic patterns S D

**A76-18382** Cardiovascular effects of long-term cigarette smoking and nicotine administration. S S Ahmed, C B Moschos, M M. Lyons, H A Oldewurtel, R J. Coumbis, and T J Regan (New Jersey Medical School, Newark, N.J.) *American Journal of Cardiology*, vol 37, Jan 1976, p. 33-40. 45 refs Research supported by the Council for Tobacco Research and American Medical Association Education and Research Foundation

Experiments were conducted to determine whether the left ventricle is altered in young beagles smoking for up to 22 months, divided in three groups: control dogs, dogs smoking 7 cigarettes/day, and dogs receiving an equivalent amount of nicotine through intramuscular administration. No statistically significant differences were revealed regarding heart rate, stroke volume, left ventricular end-diastolic pressure and volume, and intraventricular conduction times. Hypertrophy, inflammation, and abnormalities of cell ultrastructures were absent, and myocardial lipid and cation composition were normal. Since interstitial fibrosis was evident in both experimental groups, an alteration of elastic elements may be operative. These cardiovascular abnormalities appear to be primarily dependent on the nicotine of the cigarettes S D.

**A76-18486 #** Algorithmic elements for the computerized analysis of three-dimensional scenes (Elementy algoritmov avtomaticheskogo analiza trekhmernykh stsen). G G Vainshtein, E A Moskvina, and A A Salimov. In *Iconics: Digital holography. Processing of images*. Moscow, Izdatel'stvo Nauka, 1975, p. 73-88 11 refs. In Russian

The paper considers the problem of designing the visual system of a robot consisting of a digital computer connected to a television camera which would perceive a three-dimensional scene. The design of the television system is specified, and search algorithms are presented for locating objects in the visual field by means of automatic image focusing and contour recognition B J

**A76-18483 #** Morphofunctional characterization of the intramural nervous system of the heart during variations (stimulation and depression) of the sympathetic part of the autonomic nervous system (Morfofunktsional'naya kharakteristika intramural'nogo nervnogo apparata serdtsa v usloviyakh izmenenii /stimulatsii i ugneneniya/ simpaticheskogo otdela vegetativnoi nervnoi sistemy). O V Volkova and M Z Chunaeva. In *Intranodal synapses and neurotissular interrelations (Vnutriuzlovoye mezhneironal'nye svyazi i neirotkanevye vzaimootnosheniya)*. Leningrad, Izdatel'stvo Nauka, 1975, p. 29-35, 113, 114 19 refs. In Russian

**A76-18484 #** Ganglionic neurons of the heart and their interrelations with innervated tissue (Neirony serdechnykh gangliov i ikh vzaimootnosheniya s innerviruemoi tkanyu). T F Kuleshova. In *Intranodal synapses and neurotissular interrelations (Vnutriuzlovoye mezhneironal'nye svyazi i neirotkanevye vzaimootnosheniya)*. Leningrad, Izdatel'stvo Nauka, 1975, p. 62-65, 148-152 10 refs. In Russian

Experiments were carried out to identify the neuron structure of the heart ganglia from the normal heart of adult animals and individuals who have died as a result of accidental injuries. Results indicate that the heart ganglia in man and animal consists mainly of multipolar neurons of various shapes: stellate, oval, pear-shaped, and spindle-shaped. Most of these multipolar neurons are found to be typical motor neurons. The structure of the synaptic terminals of the motor neurons of the heart is discussed. The structures composed of the branches of the dendritic processes are absolutely identical to the receptor systems in different interior organs. There is enough evidence to suggest that in addition to motor neurons, the heart has its own receptor neurons, which confirms the existence of a substrate for intraorganic reflex arches S D

**A76-18551 #** Emotional stress and brain limbic system (Emotsional'nyi stres i limbichna sistema mozku). F P Vediaev (Kharkiv's'kii Medichnii Institut, Kharkov, Ukrainian SSR) *Fiziologichnii Zhurnal*, vol 21, Nov-Dec. 1975, p. 723-731 31 refs. In Ukrainian

The article deals with the data on neurodynamic, vegetative and hormonal correlates of different emotional and stress states. The following is studied as models of these states: local electrostimulation of emotogenic zones of limbic formations, the model of neurogenic stress, the model of the conditioned-reflex negative-emotional response. These studies were performed in chronic experiments on rabbits, cats and rats. The results of the studies showed that the emotional and stress syndrome is accompanied by distinct shifts in the cardiovascular system and bioelectrogenesis of the limbic-neocortical system. The data are presented on the differentiated effect of the limbic formations (amygdala, hippocampus, septum) on basic hemodynamic parameters. The model is developed for a neurogenic stress as resulted from the action of afferent stimuli program. This syndrome was accompanied by peculiar vegetative and bioelectric correlates. A conditioned-reflex reproduction of the emotional stress syndrome is shown to be possible (Author)

**A76-18552 #** Structural and functional changes in the kidneys under hypoxic hypoxia (Strukturno-funktsional'ni zmini nirok pri gipoksichnii gipoksii). V S Bilokirynits'kii and O M Grin'. (Kyiv's'kii Institut Zagal'noi ta Komunal'noi Higieny, Kiev, Ukrainian SSR) *Fiziologichnii Zhurnal*, vol 21, Nov-Dec. 1975, p. 787-794 11 refs. In Ukrainian

Indices of electrolytic balance of the urine and the morphohistochemical characteristics of the kidneys were determined in female white rats under acute and chronic hypoxia. It was found that under acute hypoxia there takes place a drop in the diurnal diuresis by 53%, a lowering of the pH, a drop in concentration and absolute amount of chlorides, an increase in sugar and protein concentration in the urine, and a certain redistribution in the activity of the enzymes without pronounced morphological changes in the kidneys

Under chronic hypoxia, the diurnal diuresis decreased by a factor of 103, the pH shifted strongly toward the alkaline, protein concentration increased, and chloride concentration decreased. Sugar was not observed in the urine. Various disturbances of the hemodynamics and lymphodynamics were observed along with dystrophy in part of the renal convoluted tubule epithelium. P T H

**A76-18553 #** On estimation of external respiration function efficiency under extensive affections of lung tissue and hypoxia in people (Do otsinki efektyvnosti funktsii zovnishn'ogo dikhannia pri obshirnikh urazhenniakh legenevoi tkanini ta gipoksii u liudin) N V Lauer, G G Gorovenko, L I Zhukovskii, and S M Dmitrenko (Akademiia Nauk Ukrain's'koi RSR, Institut Fiziologii, Kiivs'kii Institut Tuberkul'ozu i Grudnoi Khirurgii, Kiev, Ukrainian SSR) *Fiziologichnyi Zhurnal*, vol 21, Nov-Dec 1975, p 800-806 9 refs. In Ukrainian

General and alveolar ventilation and gas exchange were studied in 50 patients with extensive fibrous-cavernous lung tuberculosis, 15 persons with healthy lungs and 15 healthy people under the same conditions by means of an automatic alveolar cutter and a specially designed device. The multilateral studies were performed with regard to satisfaction of metabolic requirements of the organism at rest and under a short-term effect of hypoxic loading (inhalation of gas mixture containing 15.3% of O<sub>2</sub> in nitrogen). It is established that with extensive structural damages of the lung tissue a decrease in respiration efficiency and economy at rest are the leading point in the external respiration function changes. Application of hypoxic loading showed its significance for testing the reserve potentialities of the external respiration function in patients with extensive affections of the lungs. (Author)

**A76-18554 #** Methodological aspects of estimating group norms of arterial pressure (Metodichni aspekti otsinki grupovikh normativiv arterial'nogo tisku) O O Navakatikian, O P Krasniuk, A G Pines, R Iu Sova, L O Zarits'ka, Ts P Medvedov's'ka, and A P Velikii (Kiivs'kii Institut Higieny Pratsi i Profzakhvoriuvan', Kiev, Ukrainian SSR) *Fiziologichnyi Zhurnal*, vol 21, Nov-Dec 1975, p 813-818 22 refs. In Ukrainian

Brachial, temporal, and retinal arterial pressures were determined in 280 healthy males in the range 18 to 55 years of age, and a detailed study of the distribution and variation in the characteristics was carried out that included the application of dispersion, correlational, and regression methods of analysis. The distribution of arterial pressure indices showed little variability and obeyed a normal law. About 6-10% of the changes in the studied indices were due to age effects. A high degree of correlation between the systolic and diastolic pressure in the corresponding vessels of different subjects was established. Regression equations for calculating various arterial pressure indices are given, and the advantages of complex determination of statistical characteristics of the regional arterial pressure indices are compared with the use of group norms. P T H

**A76-18555 #** Concurrent changes in some rheoencephalographic and oxihemographic indices under the influence of mental work in human operators at data processing centers (Spolucheni zmini deiatikh reoentsefalografichnikh ta oksigemografichnikh pokaznikiv pid vplivom rozumovoi pratsi u operatoriv obchisluvai'nikh tsentriv) O A Kononenko and V V Mikheev (Kharkiv's'kii Institut Higieny Pratsi i Profzakhvoriuvan', Kharkov, Ukrainian SSR) *Fiziologichnyi Zhurnal*, vol 21, Nov-Dec 1975, p 840, 841 10 refs. In Ukrainian

**A76-18556 #** Method for estimating degree of hyperoxia in an experiment (Do metodiki otsinki stupenia giperoksii v eksperimenti) V V Matsinin (Akademiia Nauk Ukrain's'koi RSR, Institut Fiziologii, Kiev, Ukrainian SSR) *Fiziologichnyi Zhurnal*, vol 21, Nov-Dec 1975, p 848, 849 12 refs. In Ukrainian

Standardization of hyperoxic regimes is discussed on the basis of data on the physiological and biochemical appearance of oxygen

poisoning. For determination of standard toxic dose, Dickens' (1955) formula for the relationship between oxygen pressure and the time for onset of the toxic action of oxygen during the course of biochemical reactions in the brain is proposed. P T H

**A76-18662 #** Study on team performance of controlling YS-11 aircraft. H Hagihara, S Aramaki, and Y Nagasawa (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo, Japan) *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 16, June 1975, p 1-10 20 refs. In Japanese, with abstract in English

Motion-picture and tape-recorder studies were made of the performance and responses of a pilot and copilot during takeoff, flight, and landing. The pilot and copilot responded simultaneously to 57% of in-flight visual information, and 33% of decision making, but continuous control and piloting action by the pilot was accompanied by discrete actions on the copilot's part. The frequency of responses to heads-up display and side panels, and accompaniment of speech utterances by related action, are noted. Sonagrams, word duration, voice frequency analysis, and histograms of uttered responses at various phases of flight are presented. R D V

**A76-18623** Effects of alcohol and marijuana on dynamic visual acuity. I - Threshold measurements. B Brown, G Haegerstrom-Portnoy (Smith-Kettlewell Institute of Visual Sciences, San Francisco, Calif.), A J Adams, M C Flom (California, University, Berkeley, Calif.), and R T Jones (California, University, San Francisco, Calif.) *Perception and Psychophysics*, vol 18, no 6, Dec 1975, p 441-446 12 refs. Grants No DADA17-73-C-3106, No NIH-K02-MH-32904, No NIH-DA-00033

**A76-18624** Stochastic properties of binocular-rivalry alternations. P Walker (Preston Polytechnic, Preston, England) *Perception and Psychophysics*, vol 18, no 6, Dec 1975, p 467-473 14 refs

Previous researches have demonstrated that the successive phase durations in binocular rivalry are independent. These findings are confirmed and extended to chromatic stimuli. The nature of the function that is shown to describe the distribution of the dominance phase durations is consistent with the independence of successive phases and suggests that a parallel may exist between binocular rivalry and the perceptual reversal of ambiguous figures. (Author)

**A76-18625** Linear and nonlinear opponent color coding. J G W Raaijmakers and C M M de Weert (Nijmegen, Katholieke Universiteit, Nijmegen, Netherlands) *Perception and Psychophysics*, vol 18, no 6, Dec 1975, p 474-480 10 refs

The energy of the red stimulus required for cancellation of the green in a mixture of a unique green and a unique yellow was determined for two subjects. Results confirmed the linearity axiom proposed by Krantz (1975). There was some evidence of masking of a weak hue component by a strong one. The relationship of hue magnitude estimates obtained for the green component in variable mixtures of unique green and unique yellow stimuli was found to be affected by the amount of yellow added. The best fit to the data was obtained with a relation in which the proportion of the green luminance is taken as the relevant psychophysical factor (Yager and Taylor, 1970). C K D

**A76-18662 #** Study on team performance of controlling YS-11 aircraft. H Hagihara, S Aramaki, and Y Nagasawa (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo, Japan) *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 16, June 1975, p 1-10 20 refs. In Japanese, with abstract in English.

Motion-picture and tape-recorder studies were made of the performance and responses of a pilot and copilot during takeoff, flight, and landing. The pilot and copilot responded simultaneously

to 57% of in-flight visual information, and 33% of decision making, but continuous control and piloting action by the pilot was accompanied by discrete actions on the copilot's part. The frequency of responses to heads-up display and side panels, and accompaniment of speech utterances by related action, are noted. Sonagrams, word duration, voice frequency analysis, and histograms of uttered responses at various phases of flight are presented. R D V

**A76-18663 #** A study of progress in flying performance revealed from daily check sheets in a Primary Flight Training course I - An analysis of instructors' ratings. M. Okaue, M. Nakamura, and M. Nakamura (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo, Japan). *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 16, June 1975, p 11-18. In Japanese, with abstract in English.

**A76-18664 #** Histopathological pulmonary changes occurring in rats with prolonged exposure to 100 per cent oxygen at one atmosphere. I. C. Mizumoto and N. Nitani (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo, Japan). *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 16, June 1975, p 19-23. 11 refs. In Japanese, with abstract in English.

**A76-18665 #** Investigation of work load in ATC services - An experiment by using RAPCON radar simulator. Y. Kakimoto, Z. Kato, I. Kuroda, M. Kikuchi, and K. Nakatsuru (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo, Japan). *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 16, June 1975, p 25-33. 13 refs. In Japanese, with abstract in English.

A RAPCON radar simulator was employed in an experiment in which subjects performed traffic control tasks dealing with five aircraft simultaneously from initial point of perception to landing. The error rate per aircraft handled, the communication congestion rate over a five-minute period, and the mean heart rate (in beats per min) were considered in performance evaluations. The mean heart rate was stepped up perceptibly when the number of aircraft to be controlled was increased beyond four. R D V

**A76-18666 #** A bio-feedback technique by use of the heart rate tachometer device. M. Ono (Japan Air Self-Defense Force, Aeromedical Laboratory, Tachikawa, Tokyo, Japan). *Japan Air Self Defence Force, Aeromedical Laboratory, Reports*, vol 16, June 1975, p 35-41. 6 refs. In Japanese, with abstract in English.

An electronic bio-feedback system was designed to feed back heart rate data via an external circuit to a human subject, with visual and auditory stimuli. A heart rate level attained during mental performance involving some anxiety and mental strain was fed back to the subject. The circuitry of the device, incorporating an ECG preamplifier, a frequency calibrator, a cardiometer, and a Schmitt trigger circuit and driver-amplifier, is described and diagrammed. ECG signals from bipolar chest electrodes modulated a cardiometer lamp output. A lamp or buzzer was triggered on when the heart rate reached set point and the information was displayed to the subject as a feedback signal. The bio-feedback technique may be used to examine reactions of the autonomous nervous system during activities involving mental strain and anxiety. R D V

**A76-18712** Central ventilatory responses to O<sub>2</sub> and CO<sub>2</sub> at three levels of carotid chemoreceptor stimulation. L.-Y. Lee and H. T. Milhorn, Jr. (University of Mississippi Medical Center, Jackson, Miss.). *Respiration Physiology*, vol 25, Dec 1975, p 319-333. 34 refs. Grant No. PHS-HL-11678.

The steady-state ventilatory responses of the central respiratory mechanism to hypoxia and hypercapnia at three levels of carotid stimulation were studied in anesthetized dogs. A cross-perfusion technique was used to supply the carotid arteries of a recipient dog with blood of desired oxygen tension from a donor. The recipient

dog was allowed to spontaneously breathe specific gas mixtures for 6-min periods to induce central hypoxia and hypercapnia. Results show that hypoxia depresses ventilation centrally even at moderate levels (oxygen partial pressures of 45-55 mm Hg), probably as the result of central hypocapnia due to increased cerebral blood flow. The central ventilatory response to CO<sub>2</sub> is depressed by hypoxia. This hypoxic depression of central CO<sub>2</sub> sensitivity is reduced by an increase in carotid chemoreceptor drive. C K D

**A76-18713 #** Computation of some hemodynamic indices during functional tests with the use of a general-purpose mini-computer (Vychislenie nekotorykh pokazatelei gemodinamiki pri funktsional'nykh probakh s primeneniem mini-UVM). T. A. Volkhonskaia and V. V. Burak (Akademiia Nauk Ukrainskoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR). *Kibernetika i Vychislitel'naia Tekhnika*, no 29, 1975, p 46-50. In Russian.

An automated computational system is developed for determining the relative changes in common hemodynamic indices during rheographic functional tests using a high-speed general-purpose minicomputer capable of performing 20,000 operations/sec. The algorithm for calculating the hemodynamic indices from initial data on human physiological characteristics is described along with the block diagram of the routine for the input of initial data. The proposed computational system is shown to ease the physician's work in the diagnosis of rheograms and calculation of pertinent indices of the cardiovascular system in man. S D

**A76-18714 #** Radiometric identification technique for evaluating dynamic parameters of the heart and vascular system (Metod radiometricheskoi identifikatsii v otsenke dinamicheskikh parametrov serdtsa i sosudistoi sistemy). N. G. Gorbushin (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Kibernetika i Vychislitel'naia Tekhnika*, no 29, 1975, p 54-62. 26 refs. In Russian.

The paper outlines the basic concepts underlying the technique of radiometric identification and its application to the investigation of the cardiovascular system by means of dynamic parameters which have an analytical relationship with the biomechanical properties of the myocardium and blood circulation. The concept of negative viscosity is set forth as a primary symptom for an early pathology of the contractile function of the myocardium. The block diagram of radiometric identification technique is discussed along with the distribution of the values of rigidity and viscosity in systole and diastole. The behavior of an administered tracer in the dynamic response of the circulation system with allowance for the structural properties of the vascular system is examined. S D

**A76-18716 #** Investigation of the information content of symptoms and systems approach in the evaluation of indices (Issledovanie informativnosti priznakov i sistemnyi podkhod k otsenke pokazatelei). N. I. Moiseeva, E. A. Korneva, V. M. Klimenko, and D. B. Peichev (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR). *Kibernetika i Vychislitel'naia Tekhnika*, no 29, 1975, p 77-84. 14 refs. In Russian.

A complex analysis technique is proposed for estimating the significance of clinical symptoms and physiological indices for diagnostic purposes in medical and biological investigations. The proposed technique comprises elemental analysis of an object by discriminating and examining its separate elements with arbitrary provision for weak interactions, in combination with a systems analysis of the object as a whole entity characterized by integral sets of interrelated elements. There is enough evidence to confirm that data on damage to cranial nerves are highly informative. The dynamics of variations in the activity of hypothalamic structures and their activity interrelations during immunogenesis as disclosed by correlation and factor analyses is discussed. S D

**A76-18810 \* #** A versatile system for biological and soil chemical tests on a planetary landing craft. I - Scientific objectives. R J Radmer, B Kok (Martin Marietta Laboratories, Baltimore, Md ), and J P Martin (Martin Marietta Aerospace, Denver, Colo ). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 14th, Washington, D.C., Jan. 26-28, 1976, Paper 76-125* 15 p 8 refs Contract No NASw-2449.

We describe an approach for the remote detection and characterization of life in planetary soil samples. A mass spectrometer is used as the central sensor to monitor changes in the gas phase in eleven test cells filled with soil. Many biological assays, ranging from general 'in situ' assays to specific metabolic processes (such as photosynthesis, respiration, denitrification, etc.) can be performed by appropriate additions to the test cell via attached preloaded injector capsules. The system is also compatible with a number of chemical assays such as the analysis of atmospheric composition (both chemical and isotopic), the status of soil water, and the determination of compounds of carbon, nitrogen and sulfur in the soil. (Author)

**A76-18859 #** Dynamic determination of the mass properties of an astronaut. R D Watkins (USAF, Sunnyvale, Calif ) and W T Fowler (Texas, University, Austin, Tex ). *American Institute of Aeronautics and Astronautics, Aerospace Sciences Meeting, 14th, Washington, D C, Jan 26-28, 1976, Paper 76-187* 9 p 15 refs

In the past, human body models have been developed by assuming simple geometric shapes for the components of the human body in order to predict the mass properties, i.e., mass, center of mass, and inertia tensor. In this study a new personalized method of predicting component mass properties is developed, based on experimental data for whole-body mass properties for three body positions where only one component is moved. Also needed, however, are estimates for the mass and sum of the moments of inertia of each component. (Author)

## STAR ENTRIES

**N76-14020** Aerospace Medical Research Labs, Wright-Patterson AFB, Ohio

### AIRCREW CAPABILITIES AND LIMITATIONS

R N Slarve *In* AGARD The Effects of Buffeting and other Transonic Phenomena on Maneuvering Combat Aircraft Jul 1975 p 9-14

The pilot factors that can influence aircraft tracking precision during maneuvering flight and the effects of sustained and vibratory accelerations on human performance were reviewed. The effects of various values of buffeting accelerations on vision were presented. It was pointed out that the effect of sustained acceleration on tracking is of far more importance than that of vibration in the current operational environment. Degradation effects of the following factors on pilot performance were discussed: noise, temperature, fatigue, psychological motivation, personal equipment, man-machine interface/control dynamics and configuration. It appears that the best vibration alleviation techniques primarily involve adequate pilot restraints and seating design to minimize excessive relative cockpit-pilot motion.

Author

**N76-14038** Advisory Group for Aerospace Research and Development Paris (France)

### SIMULATION DEVELOPMENT, VALIDATION AND PILOT LEARNING

*In* its Approach and Landing Simulation Oct 1975 p 19-28

Views and experiences are presented regarding the processes and procedures used to develop confidence in a simulation. Overall interactions of the various elements in approach and landing simulation are discussed. Achieving confidence in a simulation through the demonstration of its acceptability by simulating an existing known aircraft is emphasized. The significance of the pilots' learning process is demonstrated as well as their experience level with a specific simulation in the development of their confidence in that particular simulation. J A M

**N76-14744** Temple Univ., Philadelphia Pa

### THE FEASIBILITY OF USING PHYTOPLANKTON IN A QUANTITATIVE METHOD OF DETECTING LOW LEVELS OF RADIONUCLIDES Ph D Thesis

Thomas Allen Jenckes 1975 134 p

Avail Univ Microfilms Order No 75-28226

The use of phytoplankton as a bioconcentrator for measuring low levels of radionuclides in water is reported. Green unicellular algae were selected due to their ability to yield high concentration factors. Results show that the algal system can be used to quantify unknown radionuclide levels but that the method is not a practical choice. Dissert Abstr

**N76-14745** Washington Univ., Seattle

### AN ECOLOGICAL STUDY OF CERTAIN BLUEGREEN ALGAE IN FOUR SEATTLE-AREA LAKES Ph D Thesis

Abraham Johannes Hendrik Pieterse 1974 358 p

Avail Univ Microfilms Order No 75-28415

A comparative study of four Seattle area lakes was undertaken for a one year period. The chemical and physical conditions in the lakes were studied on a weekly basis and compared with

changes in phytoplankton populations and abundance. Common and repeatable or unique trends in the characteristics of the bluegreen algae populations were identified, and from these trends, postulates are made to explain the mechanisms of the trends in order to relate the bluegreen algae to environmental conditions under which they live in nature. The results indicated that metalimnetic growth of phytoplankton species is relatively common in lakes with a relatively shallow epilimnion and these populations determine the qualitative and quantitative status of the phytoplankton populations of the surface water. This may be a primary reason why the principle of competitive exclusion cannot be applied to the phytoplankton of some lakes. Dissert Abstr

**N76-14746** Washington Univ., Seattle

### PHYSICAL CHARACTERIZATION OF PHYCOBILIPROTEINS FROM BLUEGREEN ALGAE Ph D Thesis

Masanori Kato 1975 132 p

Avail Univ Microfilms Order No 75-28373

The 10S oligomer of phycocyanin from *Phormidium luridum* has been isolated and purified by ammonium sulfate fractionation and a series of gel chromatographies. The protein is characterized by its sedimentation constant 10.2S, the diffusion constant 4.73 x 10<sup>-7</sup> sq cm/sec, and intrinsic viscosity 3.89 ml/g. The molecular weight of the oligomer is calculated to be 209,000. The shape and dimensions of the hexamer are discussed in terms of a model consisting of subunits arranged with C<sub>6</sub> symmetry. The monomer, assumed to be spherical, is found to have a radius of 22 Å, and the diameter across the hexamer is 132 Å. The latter figure agrees closely with dimensions observed in electron micrographs. Dissert Abstr

**N76-14747** American Univ., Washington D C

### HIGH-PURITY, BACTERIA-FREE AND ENDOTOXIN-FREE WATER Ph D Thesis

Narbik A Karamian 1975 129 p

Avail Univ Microfilms Order No 75-28935

A spectrophotometric method was developed for assaying endotoxins at levels as low as 10 ppb. Five different endotoxins: *E. coli* 0127:B8, *E. coli* 055:B5, *S. abortus equi*, *S. enteritidis*, and *S. flexneri* were tested. It was demonstrated that membranes made from solutions of 18 wt % cellulose acetate, 24 wt % water and 58 wt % 1,4-dioxane can reject 98.5% of the endotoxins from aqueous solutions containing ppm levels of the contaminant at operating pressures as low as 50 psi. These membranes exhibited an average flux of 108.3 gal/day-sq ft under these conditions. The following factors were examined for their contributions to the membrane flux and endotoxin rejection properties: casting solution composition and viscosity, temperature and composition of quenching medium, membrane thickness, and percolating time. The practical advantages of making membranes from the above formulation are discussed. A simple and self-regulated all-glass automatic distillation apparatus for preparing and storing high-purity, bacteria-free and endotoxin-free water was constructed. The components of the system, the operating procedure and cleaning and sterilizing methods are fully described. The results of chemical and bacteriological tests of the apparatus are presented. Dissert Abstr

**N76-14748#** Canada Inst. for Scientific and Technical Information, Ottawa (Ontario)

### THE EXCRETION OF GLYCOLATE BY CHLOROGONIUM ELONGATUM DANGEARD

H Stabenau 1975 14 p refs. Transl. into ENGLISH from *Biochemie und Physiologie der Pflanzen* (West Ger.) v 163, no 1, 1972 p 42-51.

(NRC/CNR-TT-1831) Avail NTIS HC \$3.50

Experiments on *Chlorogonium elongatum* to determine the conditions under which the cells excrete glycolate are reported. The materials and methods and results are described. It was found that the highest rate of excretion resulted from aeration with pure oxygen. Under these conditions the starch content of the cells decreased. An increase in the partial pressure of CO<sub>2</sub> reduced the excretion of glycolate. With 2 vol % CO<sub>2</sub> in the aeration mixture no acid excretion was detected. Glycolate was excreted in red as well as in blue light; the rate of excretion being somewhat higher in blue light. F O S

**N76-14749#** Canada Inst for Scientific and Technical Information, Ottawa (Ontario)

**ANIMAL BEHAVIOUR AND CIRCADIAN RHYTHMS**

V B Chernyshev 1975 18 p refs Transl into ENGLISH from Zh Obshch Biol (Moscow), v 34 no 2, 1973 p 284-293

(NRC/CNR-TT-1829) Avail NTIS HC \$3 50

The behavior of various animals is analyzed with them transferred from a natural rhythmic environment to a constant environment. It is suggested that the parameters of the circadian rhythm depend on the experimental conditions. Author

**N76-14750\*#** Transemantics, Inc. Washington, D C

**CONSERVATION OF ENERGETIC BALANCE AS A BASIS OF ADAPTION PROCESS**

N I Kalabukhov Washington NASA Dec 1975 36 p refs Transl into ENGLISH from Zh Obshch Biol (USSR) v 7 no 6 1946 p 417-433

(Contract NASw-2792)

(NASA-TT-F-16686) Avail NTIS HC \$4 00 CSCL 06C

The author proposes the hypothesis that adaptation of an organism occurs by means of regulating the influx or loss of energy, thereby leading to supporting the energetic balance of the organism. Author

**N76-14751** California Univ., Los Angeles

**A STUDY OF THE ELECTRICAL PROPERTIES OF THE TRANSVERSE TUBULAR SYSTEM IN SKELETAL MUSCLE** Ph D Thesis

Richard Tacke Mathias 1975 121 p

Avail Univ Microfilms Order No 75-26967

The linear electrical properties of muscle cells were studied. A new model for the transverse tubules was derived. This model is tested on various actual networks and shown to be valid. It is shown that the previous model for the T-system fails to fit actual networks. New circuit parameters for muscle fibers from experimental data are derived when the resistivity of the lumen of the tubules now being equal to the resistivity of the bathing solution. The new model for the transverse tubular system is derived assuming each branch of the T-system is a miniature transmission line which can be described by standard two port theory. The points where these branches join are considered nodes in a deterministic network, this network possessing either three or four branches per node. These assumptions allow one to write a set of linear partial difference equations for the potential at each node. Dissert Abstr

**N76-14752** Temple Univ., Philadelphia Pa

**AUTOREGULATION IN THE MICROVESSELS OF SKELETAL MUSCLE** Ph D Thesis

Ronald Frank Tuma 1975 165 p

Avail Univ Microfilms Order No 75-28254

The control mechanisms in the microcirculation of tenuissimus muscles of cats and rabbits were studied. Changes in capillary blood flow were determined by measuring the transient time of red blood cells between two photosensing windows by using a cross correlator computer. Evidence indicated that there is no specific branching order of the arterial vessels in the tenuissimus muscle which functions as a precapillary sphincter. It was also determined that blood flow distribution was not homogeneous, that tissue oxygen tension influenced the rate of capillary blood flow and that the initial hyperemia produced after removal of arterial occlusion was not due to hypoxia. Dissert Abstr

**N76-14753** Tennessee Univ., Knoxville

**ENERGY COSTS OF SPECIFIC CUSTODIAL WORK TASKS** Ph D Thesis

Joe Foust Smith 1975 57 p

Avail Univ Microfilms Order No 75-26737

Energy costs for various work tasks performed by custodial work crews were considered. The data should provide information which would be of value to physicians in determining the degree of danger this particular occupation may hold for coronary patients returning to work. The subjects were seven male employees who performed custodial work tasks. Nine work tasks that were

representative of the normal work activities of the crew were selected for measurement. Oxygen consumption and heart rate were the two parameters measured. Energy costs were determined from the oxygen consumption values and were expressed in several different units for comparison. The average energy requirements of the various work tasks ranged from 3.4-6.4 kcal per minute with the largest value resulting from dust mopping the arena floor. Dissert Abstr

**N76-14754** California Univ., Los Angeles

**IN VIVO ANALYSIS OF COMPACT BONE STRUCTURE** Ph D Thesis

David Solomon Wishko 1975 150 p

Avail Univ Microfilms Order No 75-27008

The strength of cortical bone structure is assessed in vivo through the utilization of three independent measurements made on normals and patients. The first was the photon absorption technique which was used to determine the bone mineral content and the overall diameter of the bone. The second was measurement of the speed of ultrasound through the transverse direction of the cortical bone and the third was a radiograph of the bone to determine the cortical thickness. Through the use of these methods, quantitative measurement of bone mineral content and the speed-of-sound was obtained. In addition with the use of a bone model additional properties, e.g., modulus of elasticity, compact bone density, bone mineral density and percent ash content were derived. Dissert Abstr

**N76-14755** British Library Lending Div., Boston Spa (England)  
**RELATIONS BETWEEN RADIATION DOSE AND SOMATIC RADIATION RISK**

V W Jacobi [1975] 17 p refs Transl into ENGLISH from Atomwirtschaft (Duesseldorf) Jun 1974 p 278-283

(BLL-CE-Trans-6697-(9022 09)) Avail British Library Lending Div Boston Spa Engl

Results are described in radiation biology which indicate that with exposure to soft ionizing radiation a nonlinear dose-response relation is very much more probable than a linear relation. This finding is of great importance since both occupational radiation exposure and also the radiation exposure of the population is caused almost exclusively by this type of radiation. Risk analyses show that in the lower dose range the carcinogenic effect of X-rays, gamma rays, and beta-rays is substantially less than has been assumed. It is concluded that in the dose range below 50 rad the real mean radiation cancer risk to be expected is probably no greater than 0.0001% per rad. Author

**N76-14756** Washington Univ., Seattle

**AN ULTRASONIC SYSTEM FOR MEASUREMENT OF VESSEL CROSS SECTION** Ph D Thesis

Roy Wallace Martin 1975 322 p

Avail Univ Microfilms Order No 75-28395

A prototype system is described to measure arterial sectional area. The instrument is a portion of a total system to ultimately measure cardiac flow continuously. The sensors of the system consist of an array of ultrasonic transducers mounted on the tip of a 2 mm outside diameter catheter. An analysis of the flow and area measurement problem is presented. The developed electronic scanning system which operates the transducer array is described in detail. In vitro and in vivo tests of the unit have demonstrated the feasibility of the sectional area measurement portion of the system. A review of pulse-echo systems utilizing radar theory is included. Dissert Abstr

**N76-14757\*** National Aeronautics and Space Administration  
Lyndon B Johnson Space Center Houston, Tex

**MEDICAL SUBJECT MONITORING SYSTEMS** Patent

Garry J Cleveland (LMSC, Sunnyvale Calif) George M Loh (LMSC, Sunnyvale Calif) Robert S Lunce (LMSC Sunnyvale, Calif) Norman Belasco, Marko I Lipanovich (LMSC Sunnyvale, Calif) Howard E Petersen (LMSC Sunnyvale, Calif) Sam L Pool and Donald W Mangold inventors (to NASA) (Boeing Co., Pasadena Tex) Issued 7 Oct 1975 12 p Filed 25 Apr

1973 Supersedes N73-22045 (11 - 13 p 1486)  
(NASA-Case-MSC-14180-1 US-Patent-3 910 257,  
US-Patent-Appl-SN-354406, US-Patent-Class-128-2 1A  
US-Patent-Class-128-2H US-Patent-Class-128-2 06R) Avail  
US Patent Office CSCL 06B

Medical monitoring systems allowing the monitored subject freedom of movement are described. The outputs of the sensors are suitably amplified and conditioned to provide the necessary voltage levels for the multiplexers in the analog-to-digital (A/D) converters. The measured phenomena are displayed at a remote monitoring and control station. The entire system includes a bio-belt linked by optically coupled transmission and reception links to a data acquisition unit (DUA) having a central station function of controlling and displaying the output from the bio-belt. Official Gazette of the U.S. Patent Office

**N76-14758#** Advisory Group for Aerospace Research and Development, Paris (France)

**AEROMEDICAL IMPLICATIONS OF RECENT EXPERIENCE WITH COMMUNICABLE DISEASE**

R E Mammen, ed (Naval Aerospace and Regional Med Center, Pensacola, Fla) Sep 1975 88 p refs Conf held at Toronto, Canada 7-8 May 1975

(AGARD-CP-169) Avail NTIS HC \$5 00

Epidemiology detection and diagnosis, treatment and prevention of infectious diseases of aeromedical interest are discussed

**N76-14759** Institut fuer Wehrmedizin und Hygiene, Koblenz (West Germany)

**EPIDEMIOLOGIC RISK FACTORS OF FLUSH-RECYCLE TOILETS IN AIRCRAFT**

Wolfgang H Fischer /in AGARD Aeromedical Implications of Recent Experience with Communicable Disease Sep 1975 2 p

In connection with emergency air transports from areas of low hygienic standards and presence of important infectious diseases, laboratory tests and field trials disclosed a number of serious hygienic deficiencies which were taking an exceedingly critical course during middle range and long distance flights and also by exposal of ground servicing personnel and vehicles to infectious waste material. It is shown that toilet sanitation systems presently used in airliners do not meet the standards required for the health of air crews and passengers. Commonly used sanitary fluids for toilet operation are presented and their quality discussed. Recommendations are given to improve the aircraft toilet sanitation. Author

**N76-14760** Air France, Paris Service Medical Central  
**TRANSPORTATION OF PASSENGERS WITH CONTAGIOUS DISEASES ON AIRLINERS [LE TRANSPORT DES MALADES CONTAGIEUX EN AVION DE LIGNE]**

Michel Penn /in AGARD Aeromedical Implications of Recent Experience with Communicable Disease Sep 1975 8 p refs In FRENCH, ENGLISH summary

The problems related to the transportation of passengers with contagious diseases on airliners were discussed. It was pointed out that the refusal of most airlines to transport such passengers can scarcely be justified by reference to either laws or regulations, it introduces the risk of arbitrary, mistaken or prejudiced conduct and it can cause serious harm to certain patients. It also does not seem logical since airlines learn about only a small fraction of the contagious persons who travel, and public health is much more greatly endangered by unknown contagious persons. It was concluded that airlines should continue to refuse to transport only those passengers having diseases characterized by vomiting or serious diarrhea or transmitted through the air if it is impossible by simple means to avoid the risk of contaminating other travellers and flight crew members who might be receptive. Author

**N76-14761** Johann-Wolfgang-Goethe-Universitat Frankfurt am Main (West Germany)

**FOOD POISONING OBSERVED WITH AIRPLANE CREW AND PASSENGERS DEPENDING ON AIRPLANE OPERATIONS**

R Schubert /in AGARD Aeromedical Implications of Recent Experience with Communicable Disease Sep 1975 3 p refs

Many food poisonings can more easily be caused during air plane operations. They can create even more serious problems than on earth. In this connection they can be caused during the flight if it is of long duration and even bring about the symptoms of the illness. More frequently however they have been acquired before. Sometimes a gastrointestinal disturbance, the traveller's disease can be observed appearing like a food poisoning without being such in the original sense. On flights from certain regions of the globe especially from the Far East one must expect cases of food poisoning in the air traffic more often than from other countries. Author

**N76-14762** Bayerische Landesimpfanstalt, Munich (West Germany)

**IMPORTATION, DIAGNOSIS AND TREATMENT OF SMALLPOX, CHOLERA AND LEPROSY**

H Chr Huber V Hochstein-Mintzel, and H Stickel /in AGARD Aeromedical Implications of Recent Experience with Communicable Disease Sep 1975 4 p refs

Since 1957 a total of 11 cases of smallpox have been introduced into the FRG. The final diagnosis was usually delayed until the 10th day after the onset of clinical symptoms. The diagnosis of variola must be supported by epidemiological data and laboratory tests. Epidemiological data refer to travel in endemic areas, the probability and time of contact, and the resulting incubation period. Laboratory examination is usually restricted to three tests: serological examination for hemagglutination inhibiting antibodies, electron microscopy of skin scrapings, and virus isolation on the chorioallantoic membrane of embryonated eggs. The importation of cholera and leprosy bears minor problems as to the possible spread of the diseases. Introduction of cholera cannot be avoided by public health measures. An endemic spread, however, does not need to be considered in countries of appropriate standards of public hygiene. The prognosis of the disease is quite favorable, provided that proper therapy is initiated in the early stages. Author

**N76-14763** Deutsche Lufthansa Aktiengesellschaft Frankfurt am Main (West Germany)

**TRANSPORTATION BY AIR OF A LASSA FEVER PATIENT IN 1974**

Horst H Renemann /in AGARD Aeromedical Implications of Recent Experience with Communicable Disease Sep 1975 5 p refs

Lassa fever, also known as arenavirus disease and Casals disease, was recognized for the first time in 1969 in Lassa, Nigeria. Its fatality ratio has been high in clinically observed cases, 10 out of 22 infected physicians and medical workers died of it. The person-to-person transmission probably takes place when airborne viruses from the sore mucous membranes in the mouth and pharynx are expelled by breathing, talking and coughing. A German patient with arenavirus, Dr Mandrella, was transported from Nigeria to Germany in March 1974 by Condor Boeing 707-430 manned by a volunteer flight crew of Lufthansa. The special preparation of the plane to prevent transmission of airborne viruses to the flight crew and other measures taken against contamination will be described. Author

**N76-14764** Air Transport Command Trenton (Ontario)  
**LASSA FEVER TO AIR EVACUATE OR NOT**

A J Clayton /in AGARD Aeromedical Implications of Recent Experience with Communicable Diseases Sep 1975 4 p refs

The clinical features of Lassa Fever are briefly discussed and the epidemiology of the disease is outlined with respect to the five recorded outbreaks between 1969 and 1974. The Canadian Government having become involved in two potential

air evacuations of patients from West Africa is concerned over the risks to medical flight teams and receiving hospital personnel in the event of cases of Lassa Fever being repatriated to Canada. A survey is being carried out on Canadian Forces long range transport aircraft to study the microbiological environment within two types of aircraft during flights by dispersing non-pathogenic organisms. The objective is to determine the optimum location for a patient with a highly infectious disease and to ensure minimal transmission of organisms. Author

**N76-14765** School of Aerospace Medicine, Brooks AFB Tex Epidemiology Div  
**INTERNATIONAL QUARANTINE FOR CONTROL OF MOSQUITO-BORNE DISEASES ON GUAM**  
Wesley R Nowell /In AGARD Aeromedical Implications of Recent Experience with Communicable Disease Sep 1975 8 p refs

The initial mosquito survey of Guam conducted in 1936 revealed the presence of five indigenous species. Subsequent surveys showed a steady climb to fifteen species in 1969, and a dramatic jump to thirty-five by 1972. Japanese B encephalitis, and filariasis, five primary mosquito-borne diseases known to occur on Pacific islands, have been found on Guam, and trends of the diseases are emphasized. The Island of Guam is centrally located in the Western Pacific and aircraft are implicated in the introductions of new mosquito species. Chronic problems associated with aircraft quarantine inspections and insect control procedures are described, and methods to curb the introduction of new mosquito species and their associated diseases are discussed. Author

**N76-14766** School of Aerospace Medicine Brooks AFB, Tex Epidemiology Div  
**AN EPIDEMIC OF CHIKUNGUNYA IN THE PHILIPPINE ISLANDS POSSIBLE ROLE OF AIRCRAFT DISSEMINATION**

George D Lathrop and Paul J Homme /In AGARD Aeromedical Implications of Recent Experience with Communicable Disease Sep 1975 6 p refs

Twin outbreaks of chikungunya, a Group A arbovirus, are analyzed that occurred on the Island of Negros, Republic of the Philippines during 1968-1969. Epidemiologic data derived from interviews, serologic, and virologic testing showed that young and middle aged people were immunologically susceptible and that the disease was transmitted in three week waves by the mosquito, *Aedes albopictus*. Inferential evidence suggested that acquired immunity due to an apparent 1920 chikungunya epidemic accounted for a lower attack rate in the elderly population. Chikungunya was probably introduced into Negros by aircraft or ships from Manila, where a smaller outbreak had been documented in 1967-1968. The outbreaks on Negros subsided naturally prior to increased mosquito abatement and public health control measures. Unconfirmed clinical evidence suggested that the disease was disseminated into the adjacent islands of Cebu and Mindanao. Author

**N76-14767** Bayerische Landesimpfanstalt Munich (West Germany)  
**THE ATTENUATED LIVE SMALLPOX VACCINE, STRAIN MVA RESULTS OF EXPERIMENTAL AND CLINICAL STUDIES**

V Hochstein-Mintzel, H Stickel, A Mayr, H Chr, Huber, H Schaefer and A Holzner /In AGARD Aeromedical Implications of Recent Experience with Communicable Disease Sep 1975 5 p refs. Prepared in cooperation with Inst fuer Mikrobiol., Muenchen (West Germany)

In an attempt to basically alter and improve smallpox vaccination, the use of an attenuated strain of vaccinia virus was proposed. Attenuation was effected through more than 500 continuous passages in chick embryo fibroblast cultures. Animal experiments showed the complete absence of neurovirulence for the attenuated strain. The favorable experimental results led to a field study of primary vaccinations in the human. The

recommended procedure was to administer 0.1 ml of attenuated vaccine intradermally, followed by conventional cutaneous smallpox vaccination 7 to 28 days later. The results may be summarized as follows: the local reaction to the attenuated vaccine merely amounted to slight reddening and infiltration at the site of injection with complete absence of typical vaccinal lesions. Untoward systemic reactions were not observed. The subsequent cutaneous vaccination resulted in 84% major reactions and 9% equivocal reactions. Seven percent remained negative. 78% of the takes were of the accelerated type, giving evidence of the immunizing capacity of the attenuated strain. Author

**N76-14768** Institute of Aviation Medicine Fuerstenfeldbruck (West Germany)  
**COCCIDIOIDOMYCOSIS AND AVIATION**

G Apel and V Grouls /In AGARD Aeromedical Implications of Recent Experience with Communicable Disease Sep 1975 3 p refs. Prepared in cooperation with Inst of Pathol., Bonn-Venusberg (West Germany)

In the age of transatlantic travel and mass tourism it can not be precluded that Coccidioidomycosis will be brought to areas on the globe in which this disease has hitherto been unknown. Since the incubation period will last two to three weeks and occasionally also four weeks, the disease will frequently occur only after air passengers have long returned to their home countries. Considering the striking similarity with the clinical picture of pulmonary tuberculosis, it is not surprising that in Europe the disease is diagnosed as tuberculosis, even more so since tuberculination may often be positive. The patients are then subjected to an anti-tuberculous therapy, which necessarily must remain without success in such cases. If an exact case history including travels abroad and residences in endemic areas of Coccidioidomycosis can be established, a clue pointing to the true nature of the disease may be obtained. Author

**N76-14769** Institute of Aviation Medicine Fuerstenfeldbruck (West Germany)

**THE INDUCTION OF INTERFERON AND SPECIFIC SMALLPOX IMMUNITY BY ORAL IMMUNIZATION WITH LIVE ATTENUATED POX VIRUS**

V Hochstein-Mintzel, A Mayr and H Stickel /In AGARD Aeromedical Implications of Recent Experience with Communicable Disease Sep 1975 5 p refs. Prepared in cooperation with Inst fuer Mikrobiol., Muenchen (West Germany)

In the human, oral immunization with live attenuated virus was effected by the administration of virus-containing tablets. The procedure caused no untoward effect in primary vaccinees. Subsequent skin testing and conventional cutaneous vaccination resulted in accelerated takes demonstrating successful oral pre-immunization. Attenuated heterologous pox virus was shown to have a high interferon inducing capacity. Induction was optimal when the virus was applied to the mucous membranes of the oral cavity. Clinical trials showed significant effects of interferon induction in recurrent herpetic infections. Oral application of vaccines needs neither trained staff nor medical equipment. It confers short term non-specific protection from disease, followed by specific immunity. The usual contraindications to smallpox vaccination need not be observed. Untoward effects, quite common to routine methods, are not to be expected. Author

**N76-14770** Centre Principal d'Expertises Medicales du Personnel Navigant Paris (France)

**INCIDENCE OF INFECTIOUS TROPICAL DISEASES DIAGNOSED ON FLYING PERSONNEL [IMPORTANCE DE LA PATHOLOGIE INFECTIEUSE D'ORIGINE TROPICALE DANS L'EXPERTISE MEDICALE DU PERSONNEL NAVIGANT]**

R Carre, J Patacq-Crouzet, A Didier and J Bastien /In AGARD Aeromedical Implications of Recent Experience with Communicable Disease Sep 1975 6 p. In FRENCH

Statistical data on the incidence of infectious tropical diseases diagnosed during the period 1969 to 1972 on French military and commercial flight crews was presented. The personnel



examined were those making regular trips to Africa, Madagascar the West Indies, and Reunion Island. The two diseases most widely detected were amebiasis (106 cases, including 13 severe cases localized in the liver and 93 cases localized in the intestinal tract) and malaria (45 cases, including 8 severe cases with encephalic and comatose involvements). The following other parasitic diseases were observed: bilharziasis (5 cases), filariasis (4 cases), stomatosis (2 cases), strongyloidiasis (8 cases), and ankylostomiasis (5 cases). Most cutaneous diseases detected were of bacterial origin. Viral hepatitis was widely observed on personnel having travelled in Africa, and dengue was diagnosed on military personnel returning from the Pacific. Y J A

**N76-14771** Tropen Inst Hamburg (West Germany)  
**DIAGNOSTIC METHODS IN TROPICAL MEDICINE**  
 Werner Mohr. In AGARD. Aeromedical Implications of Recent Experience with Communicable Disease. Sep 1975. 3 p

The doctor consulted by persons returning from overseas countries should have a certain knowledge of geographical medicine. He must know in which regions on the globe malaria occurs and where intestinal diseases are prevalent. A precise anamnesis of the patient's itinerary is most essential. During the physical examination the examiner is likely to recognize a number of symptoms which will help him along diagnostically: (1) Rashes and dischromia, (2) edemas, (3) fever, (4) enlargement of the liver, (5) enlargement of the spleen, (6) respiratory changes, (7) changes in stool (diarrhea), and (8) changes in urine (hematuria), to name but a few. Author

**N76-14772** Bayerische Landesimpfanstalt Munich (West Germany)

**THE THREAT OF TROPICAL DISEASES AND PARASITOSE (SOME EPIDEMIOLOGICAL AND CLINICAL ASPECTS)**

G T Werner, H Chr Huber, H Stickl, and V Hochstein-Mintzel. In AGARD. Aeromedical Implications of Recent Experience with Communicable Disease. Sep 1975. 5 p. refs

The rapid increase of travels to the warm countries has brought the threat of tropical diseases to our doors. Furthermore a great number of people are in employment overseas. Besides, the continuous influx of laborers, students or immigrants from tropical countries can create new medical problems. There is no real danger that tropical diseases are going to cause epidemics in the highly developed countries as the hygienic standards prevent generalized outbreaks. There is, however, a substantial danger in the individual case due to missed or delayed diagnosis and treatment. Reviewed are those tropical diseases which are imported frequently or which present problems in the single case. Cosmopolitan diseases which are more common in the tropics, like hepatitis, polio, tuberculosis, are excluded. Author

**N76-14773** Tropen Inst Hamburg (West Germany)  
**AIR TRAFFIC AND THE PROBLEM OF IMPORTATION OF DISEASES FROM THE TROPICS**

Werner Mohr. In AGARD. Aeromedical Implications of Recent Experience with Communicable Disease. Sep 1975. 3 p

It is not possible to deal with all diseases which could be imported from the tropics to Europe or the temperate climate zones respectively. However, helminthic diseases should be referred to briefly. The most frequent and important ones among them are hookworm infestation, bilharziosis (schistosomiasis) in all its various forms, and filariasis. Time and again it can be observed that persons returning from the tropics may have contracted a variety of infectious diseases, especially intestinal parasites. There are a number of measures that should be taken to give protection against the diseases described above: (1) Protective inoculation against certain diseases and prophylactic medication, (2) it is of great importance to instruct physicians at home, i.e. in the temperate climate zones, in tropical diseases and their diagnosis, and (3) any person on return from the tropics should be subject to a close medical examination, in particular when such a person suffered from any disturbances of health during his stay in the tropics or is still suffering from such disturbances. Author

**N76-14774\*** Southwest Research Inst San Antonio, Tex  
**SHORT RANGE MINIATURIZED BIOTELEMETRY SYSTEM**  
 Final Report

R Lorenz. 11 Dec 1975. 18 p.  
 (Contract NAS9-14404 SwRI Proj 16-4118)  
 (NASA-CR-144640) Avail NTIS HC \$3.50 CSCL 06B

A biotelemetry system for measuring and transmitting EKG, EMG, and EEG data by an RF link to a receiver was designed, developed, and delivered. The system is battery operated with the batteries and transmitting electronics an integral part of the electrode sensors. The low frequency response of 0.05 Hz assures faithful reproduction of detailed EKG and all measurements are made by the utilization of two electrode sensors. Author

**N76-14775\*** Canada Inst for Scientific and Technical Information, Ottawa (Ontario)

**NEUROMUSCULAR BLOCKING PROPERTIES OF LINCOMYCIN AND KANENDOMYCIN IN MAN**

Y Hashimoto, N Iwatsuki, T Shima, and K Iwatsuki. [1975] 13 p. refs. Transl into ENGLISH from Masui (Japan), v 20, no 5, 1971. p 407-411.  
 (NRC/CNR-TT-1833) Avail NTIS HC \$3.50

It has been well recognized that certain antibiotics such as neomycin and streptomycin have a neuromuscular blocking action, occasionally resulting in postoperative prolonged respiratory depression. An interaction between muscle relaxants and lincomycin as well as 2prime-amion-2prime-deoxy kanamycin (Kanendomycin) was investigated in man anesthetized with nitrous oxide, oxygen and halothane. Twitch tension of the finger following an electric nerve stimulation was recorded to evaluate the degree of neuromuscular block. Kanendomycin by itself produced a marked reduction in twitch tension when it was given intravenously in a dose of 2gm. The neuromuscular blocking action of d-tubocurarine chloride was potentiated by both these antibiotics and these effects were antagonized by edrophonium and calcium chloride. The action of succinylcholine was not affected by lincomycin, but it was potentiated transiently by Kanendomycin. The results suggest that it is advisable to pay attention to possible respiratory depression when these antibiotics are used parenterally in combination with nondepolarizing muscle relaxants and in myasthenic patients. Author

**N76-14776\*** Militaerpsykologiska Institutet, Stockholm (Sweden)

**RECONNAISSANCE AND VISUAL CONTRAST [SPANING OCH VISUELL KONTRAST]**

Sten Sture Bergstroem (Uppsala Univ) and Ove Franzen (Uppsala Univ). Apr 1974. 36 p. refs. In SWEDISH.  
 (MPI-23) Avail NTIS HC \$4.00

Man is studied as an observer and detector of light signals. The report largely consists of a systematic review of known facts concerning conditions which influence man's contrast threshold. It can apply to qualities of the signal and its background such as luminance, dispersal, duration, color, form and movement. The results are discussed for some cases which come within the reference framework either of preception psychology or neurophysiology. A literature search reveals gaps in our knowledge of contrast thresholds, particularly for moving signals and heterogeneous backgrounds. Author

**N76-14777\*** Civil Aeromedical Inst, Oklahoma City, Okla  
**THE USE OF VESTIBULAR TESTS IN CIVIL AVIATION MEDICAL EXAMINATIONS. SURVEY OF PRACTICES AND PROPOSALS BY AVIATION MEDICAL EXAMINERS**

William E Collins, Amelia O Lennon, and E Jean Grimm. Apr 1975. 7 p. refs.  
 (AD-A015087/O, FAA-AM-75-4) Avail NTIS HC \$3.25 CSCL 06/14

A brief voluntary questionnaire was administered to 1115 Aviation Medical Examiners (AME) to assess the frequency with which vestibular tests (broadly defined) were given during physical examinations of pilots, which tests were used, why they were used, whether AMEs believed that specific tests should be routine, and why they believed so. Of the respondents, 58 percent

routinely gave tests of balance equilibrium or vestibular functioning, 24 percent gave the tests under certain conditions, and 18 percent gave no tests. The Romberg and finger-pointing tests were the most frequently used and were employed most often for screening purposes or to identify a problem area. It is concluded that (1) any introduction of specific tests of vestibular function or equilibrium should be based in the overall medical value of the tests (not in an effort to significantly reduce disorientation-related general aviation fatalities by seeking to identify the disorientation prone since most such accidents appear to be related to normal functioning of the vestibular system) and (2) the tests should be simple. Author

**N76-14778#** Federal Aviation Administration Washington, D C Aeromedical Applications Div  
**TO SEE OR NOT TO SEE VISUAL ACUITY OF PILOTS INVOLVED IN MIDAIR COLLISIONS**

Leonard C Ryan S J Gerathewohl, Stanley R Mohler and Charles F Booze, Jr (Civil Aeromed Inst.) Sep 1975 6 p (AD-A016277/6, FAA-AM-75-5) Avail NTIS HC \$3.25 CSCL 01/2

The medical records of airmen involved in midair collisions from 1970 through 1973 were reviewed and compared with two other groups of pilots: (1) pilots involved in other types of accidents, and (2) pilots without any accident records. There is nothing in the results to indicate that the pilots with visual corrections are a greater risk. Author

**N76-14779#** Louisville Univ Ky School of Medicine  
**CORRELATION OF ANIMAL CRYPT AND STEM CELL SURVIVAL IN FISSION NEUTRON IRRADIATED MICE A CHEMICAL PROTECTION STUDY Final Report, Oct 1971 - Dec 1974**

Curtis P Sigdestad 1 Feb 1975 102 p refs

(Contract DADA17-72-C-2038)

(AD-A014065) Avail NTIS CSCL 06/15

The report surveys the effectiveness of newly synthesized antiradiation compounds (WR-2721, WR-77913, WR-638, WR-1607, WR-2347, WR-3689, WR-109342, WR-2822 and WR-2823) in comparison with the other protectors (MEA and AET). The effects of high energy X-rays (4 MeV) and fission neutrons was tested on (1) intestinal crypt survival, (2) lethality, LD50 and (3) total and per crypt cellularity. GRA

**N76-14780#** School of Aerospace Medicine Brooks AFB Tex  
**ALCOHOL AND AVIATION Aeromedical Review**

John A Bishop Jul 1975 29 p refs

(AD-A013726, SAM-Review-3-75, SAM-TR-75-17) Avail NTIS CSCL 06/15

The review provides Air Force flight surgeons information regarding the more common problems of alcohol and aviation. Background, problems, chemistry and pharmacology of alcohol are discussed. This represents one aspect of continuing education in aerospace medicine for the flight surgeon. GRA

**N76-14781#** Federation of American Societies for Experimental Biology, Bethesda Md

**SENSITIVITY OF AUDITORY AND VESTIBULAR SYSTEMS TO STIMULI OTHER THAN SOUND AND MOTION Technical Interim Report**

Kenneth D Fisher, C Jelleff Carr and John M Talbot Apr 1975 23 p refs

(Contract F44620-74-C-0077, ARPA Order 2808)

(AD-A013617 AFOSR-75-1125TR) Avail NTIS CSCL 05/10

There is evidence to suggest that auditory and vestibular systems can be stimulated by forms of energy other than sound, gravity and motion. This report reviews the evidence related to such sensitivity and indicates the potential importance of enhanced sensory capabilities. Suggestions for future research on the response of the auditory and vestibular systems to additional environmental stimuli are presented. GRA

**N76-14782#** Federation of American Societies for Experimental Biology, Bethesda, Md Life Sciences Research Office

**THE RHYTHMIC CYCLES IN MAN**

Herbert Pollack Apr 1975 28 p refs

(Contract F44620-74-C-0077, ARPA Order 2808, AF Proj 6813)

(AD-A013853, AFOSR-75-1126TR) Avail NTIS CSCL 06/16

There is ample evidence to accept the concept of multiplicity of cyclic and rhythmic functions in plants, animals and man. These vary from the ultradian and circadian to seasonal and annual cycles. There are numerous factors involved in these cyclic phenomena from photostimulation (day-night cycle) to exhaustion-replenishment feedback mechanisms. Man's ability to override the rhythms is an important factor which allows him to undertake many activities and not be limited by the rhythmic nature of these underlying mechanisms. The override capability enables him to maintain his work performance efficiently providing he is motivated and interested. Thus motivation may be more important than the circadian rhythm which can be disrupted but restored easily with the proper stimulation. The report reviews research in this field and notes areas for future research and names key investigators. GRA

**N76-14783#** Hawaii Univ Honolulu Dept of Physiology  
**WORK CAPACITY AND CARDIOVASCULAR ADJUSTMENTS OF NON-DIVING MAMMALS IN HYPERBARIC ENVIRONMENT Final Report, 1 Feb 1972 - 31 Jul 1975**

Y C Lin, L H Chen and D G Baker 31 Jul 1975 108 p refs

(Contract N00014-67-A-0387-0014, NR Proj 201-136)

(AD-A014007) Avail NTIS CSCL 06/19

Some factors which limit human performance in the hyperbaric environments have been studied in the past employing a controlled environment consisting of lumped parameters of pressure, gas density, levels of partial pressure of oxygen, carbon dioxide and inert gases, ambient temperature and humidity. The present study was designed to examine the possible interaction among these variables on the work capacity of rats, at rest and during exercise. The rat, like man, is a terrestrial non-diving mammal, and is the model employed in this study. Swimming was utilized in the present study as a means of imposing a work load on the rat. Measurements of cardiac output and its distribution, autonomic nervous control of cardiovascular functions, and oxygen consumption and conservation during apnea were studied in detail. The authors have studied the specific helium effects in the intact animal and in the isolated-perfused heart. GRA

**N76-14784#** Kentucky Univ Lexington Wenner-Gren Research Lab

**STUDY OF HEART SYNCHRONOUS WHOLE BODY ACCELERATION FOR CIRCULATORY ASSIST Report for 15 May 1973 - 12 Nov 1974**

C F Knapp, E P McCutcheon, A Bhattacharya, and J M Evans Nov 1974 123 p refs

(Contract HT-3-2928)

(PB-243807/5) Avail NTIS HC \$5.50 CSCL 06E

Cardiovascular responses of awake, chronically instrumented canines exposed to whole body acceleration (vibration) were investigated. Both normal and myocardially ischemic subjects were studied. Conclusions were that (1) cardiovascular responses could be dialed in and maintained by proper synchronization, (2) force waveforms applied to the ischemic preparation produced greater cardiovascular effects, and (3) greater modification to cardiac function was produced by a heart synchronous asymmetrical, headward displacement waveform, increasing aortic diastolic pressure by 42% and cardiac work by 66%. GRA

**N76-14785** Texas Technological Univ Lubbock  
**HUMAN PERFORMANCE PHYSIOLOGICAL RHYTHMS, AND CIRCADIAN TIME RELATIONS Ph D Thesis**

Nancy Jo Jensen Bethea 1975 199 p

Avail Univ Microfilms Order No 75-26834

During performance testing three groups of subjects recorded their oral temperature and resting heart rate at intervals throughout the day. At the same time they worked multiplication or addition problems to simulate mental performance. All subjects collected urine voided during the testing weeks. The volumes were measured and specimens analyzed for sodium potassium, chloride urea nitrogen uric acid creatinine and inorganic phosphate. Testing of psychomotor performance and rhythmometric analyses found some consistent phase relationships between physiological variables, performance levels, and individual rhythms. Some indication of circadian variability were observed. Dissert Abstr

**N76-14786#** Militaerpsykologiska Institutet, Stockholm (Sweden)

**AUDITORY PERCEPTION, A LITERATURE REVIEW**

Hans Furustig Mar 1974 67 p refs In SWEDISH ENGLISH summary

(MPI-A-22) Avail NTIS HC \$4 50

Fundamental variables in the auditory perception relevant for audible alarms are described. Dependences between the perceptual process and the characteristics of the alarm signal are discussed. The perception depends on the signal expectation, the complexity of the discrimination situation and the arousal of the individual. For air-raid signals there are also factors of the population which influence the perceptual readiness such as age, health status and family size. A holistic approach to the perception of audible alarm signals like the Gestalt Psychology is also discussed. The auditory awakening frequencies as a function of stimulus intensity at a given background noise level are estimated. Author

**N76-14787#** Virginia Univ Charlottesville Dept of Engineering Science and Systems

**UNIVERSITY OF VIRGINIA ACQUISITION OF PASSENGER RIDE QUALITY DATA ABOARD THE TOTAL IN-FLIGHT SIMULATOR (TIFS)**

Eugene W McClurken, Jr Oct 1975 112 p ref  
(Grant NGR-47-005-181)

(NASA-CR-145957 TR-403220) Avail NTIS HC \$5 50 CSCL 05E

The subjective response of passengers to vehicle motions was investigated on the Total In-Flight Simulator (TIFS) aircraft. Pre-recorded signals were converted into controlled aircraft motion for evaluation by ten subjects on a seven-point rating scale. Eighteen test flights were flown on August and September 1974, the results of which are to be used in validation studies on ground based simulators at NASA/Langley Research Center and to extend passenger response models. Author

**N76-14788#** Old Dominion Univ Research Foundation, Norfolk, Va

**A REVIEW AND PRELIMINARY EVALUATION OF METHODOLOGICAL FACTORS IN PERFORMANCE ASSESSMENTS OF TIME-VARYING AIRCRAFT NOISE EFFECTS** Final Report

Glynn D Coates and Earl A Alluisi Oct 1975 43 p refs  
(Grant NSG-1092)

(NASA-CR-145925 PAL-PR-75-4) Avail NTIS HC \$4 00 CSCL 05E

The effects of aircraft noise on human performance is considered. Progress is reported in the following areas: (1) review of the literature to identify the methodological and stimulus parameters involved in the study of noise effects on human performance, (2) development of a theoretical framework to provide working hypotheses as to the effects of noise on complex human performance, and (3) data collection on the first of several experimental investigations designed to provide tests of the hypotheses. Author

**N76-14789#** Scientific Translation Service, Santa Barbara, Calif

**THE PHYSIOLOGICAL BASIS OF INDUSTRIAL WORK**

Joseph Rutenfranz Washington NASA Dec 1975 27 p refs Transl into ENGLISH from Zentr Bakteriell Parasitenk., Abt Reihe B Ong (Berlin), v 158, 1973 p 219-238  
(Contract NASw-2791)

(NASA-TT-F-16808) Avail NTIS HC \$4 00 CSCL 05E

The following topics of modern industrial work are discussed: (1) relationship between physical fitness and the endurance limit at heavy work; (2) problems of rest pauses, and their physiological and psychological implications; and (3) basic problems of circadian rhythms in relation to night and shift work. Author

**N76-14790#** Massachusetts Inst of Tech, Cambridge Man-Vehicle Lab

**INTEGRATION OF VISUAL AND MOTION CUES FOR SIMULATOR REQUIREMENTS AND RIDE QUALITY INVESTIGATION** Semiannual Status Report, May - Nov 1975

L R Young Nov 1975 40 p refs

(Grant NSG-22-009-701)

(NASA-CR-145978) Avail NTIS HC \$4 00 CSCL 05E

Preliminary tests and evaluation are presented of pilot performance during landing (flight paths) using computer generated images (video tapes). Psychophysiological factors affecting pilot visual perception were measured. A turning flight maneuver (pitch and roll) was specifically studied using a training device, and the scaling laws involved were determined. Also presented are medical studies (abstracts) on human response to gravity variations without visual cues, acceleration stimuli effects on the semicircular canals and neurons affecting eye movements, and vestibular tests. J R T

**N76-14791#** Virginia Univ Charlottesville Research Labs for the Engineering Sciences

**PASSENGER COMFORT RESPONSE TIMES AS A FUNCTION OF AIRCRAFT MOTION**

Edward J Rinalducci Oct 1975 34 p refs

(Contract NGR-47-005-202)

(NASA-CR-145981, TR-403906 ESS-4039-104-75) Avail NTIS HC \$4 00 CSCL 05E

The relationship between a passenger's response time of changes in level of comfort experienced as a function of aircraft motion was examined. The aircraft used in this investigation was capable of providing a wide range of vertical and transverse accelerations by means of direct lift flap control surfaces and side force generator surfaces in addition to normal control surfaces. Response times to changes in comfort were recorded along with the passenger's rating of comfort on a five point scale. In addition a number of aircraft motion variables including vertical and transverse accelerations were also recorded. Results indicate some relationship between human comfort response times to reaction time data. Author

**N76-14792#** Virginia Univ Charlottesville Research Labs for the Engineering Sciences

**FLIGHT RESEARCH EXPERIMENTS ON RIDE QUALITY**

I D Jacobson and A R Kuhlthau Oct 1975 28 p refs

(Grant NGR-47-005-202)

(NASA-CR-145984, TR-403907, ESS-4039-105-75) Avail NTIS HC \$4 00 CSCL 05E

The results and analysis of several flight research experiments in ride quality are described. These tests were carried out aboard the NASA Flight Research Center, JetStar aircraft equipped with the General Purpose Airborne Simulator, and aboard a specially instrumented Boeing 747 flown in actual commercial flight. The data was analyzed to determine appropriate models for subjective reaction to the motion environment. Specifically, vertical and transverse acceleration inputs and aircraft bank angle were studied along with duration of exposure. Author

**N76-14793#** North Carolina State Univ Raleigh

**INDIVIDUAL DIFFERENCES IN HUMAN ANNOYANCE RESPONSE TO NOISE**

Richard G Pearson Franklin D Hart, and John F OBrien [1975] 64 p refs

(Grant NGR-34-002-055)

(NASA-CR-144921) Avail NTIS HC \$4 50 CSCL 05E

Individual variations in annoyance and in susceptibility to noise were studied to establish a finer definition of the ingredients

of the human annoyance response. The study involved interactions among a heterogeneous sample of human subjects, various noise stimuli and different physical environments of exposure. Significant differences in annoyance ratings among the six noise stimuli all equated for peak sound pressure level, were found. Author

**N76-14794#** Michigan Univ., Ann Arbor Inst. for Social Research

**GROUP TYPES AND INTERVENTIONS EFFECTS IN ORGANIZATIONAL DEVELOPMENT**

David G. Bowers and Doris L. Hausser Nov 1974 155 p refs

(Contract N00014-67-A-0181-0048)

(AD-A004638) Avail NTIS CSCL 05/9

The present report explores the organizational development uses of survey data. In form, the problem is one of testing the feasibility of developing an instrumented prescriptive capability for organizational development activities in the Navy. The strategy involved (1) determining whether there are relatively few pure types of groups present in the civilian data bank which accompanies the Survey of Organizations questionnaire - the parent instrument of the Navy's Human Resource Management Survey (2) determining from the Navy data collected in the course of this present contract the extent to which these pure types exist in the Navy as well and (3) examining the effect of different development activities upon the pure types thus identified. GRA

**N76-14795#** Army Foreign Science and Technology Center, Charlottesville, Va

**SEPARATION OF USEFUL SIGNAL FROM NOISE IN THE NEURONAL IMPULSE ACTIVITY OF THE COCHLEAR NUCLEUS OF A CAT**

E. A. Radionova 30 Apr 1975 19 p refs. Transl. into ENGLISH from Zh. Vyssh. Nerv. Deyatel'n. im. I. P. Pavlova (USSR) v. 15 no. 3, 1965 p. 481-489

(AD-A014052, FSTC-HT-23-0706-75) Avail NTIS CSCL 06/16

The detection and separation of useful signals from noise was studied with 180 neurons of the cochlear nucleus of a cat in sodium amytal narcosis. Characteristics of background activity of neurons of the cochlear nucleus were investigated as to the masking of useful signals by background and as to the distribution of neurons in terms of spontaneous activity. GRA

**N76-14796#** Minnesota Univ., Minneapolis Dept. of Psychology

**STRATEGIES OF ADAPTIVE ABILITY MEASUREMENT**

David J. Weiss Dec 1974 83 p refs

(Contract N00014-67-A-0113-0029, NR Proj. 150-343)

(AD-A004270, RR-74-5) Avail NTIS CSCL 05/9

A number of strategies are described for adapting ability test items to individual differences in ability levels of testees. Each strategy consists of a different set of rules for selecting the sequence of test items to be administered to a given testee. Advantages and disadvantages of each strategy are discussed, and research issues unique to the strategy are described. Strategies reviewed are differentiated into two-stage approaches and multistage approaches. Several variations of the two-stage approach are described. Multistage strategies include fixed branching and variable branching strategies. Fixed branching strategies reviewed include a number of variations of the pyramidal approach (e.g., constant step size pyramids, decreasing step size pyramids, truncated pyramids, multiple-item pyramids), the flexilevel test and the straddaptive test. Variable branching approaches include two Bayesian strategies and two maximum likelihood strategies. The various strategies are compared with each other on important characteristics and on practical considerations, and ranked on their apparent potential for providing measurement of equal precision at all levels of ability. Author

**N76-14797#** Federation of American Societies for Experimental Biology, Bethesda, Md

**BIOLOGICAL CORRELATES OF COGNITIVE, SENSORY AND MOTOR ABILITIES**

John M. Talbot Apr 1975 34 p refs

(Contract F44620-74-C-0077, ARPA Order 2808)

(AD-A013616, AFOSR-75-1124TR) Avail NTIS CSCL 05/10

The review of somesthesia attempts to highlight its biological correlates and to relate somatic sensory processes to behavior. Current knowledge of the somesthetic systems is summarized and significant gaps are noted. Exciting disclosures in the anatomy, physiology, biochemistry and biophysics of somesthetic systems are surfacing with increasing frequency as a result of modern research approaches. Progress has been rapid in the electrophysiological 'mapping' of afferent systems from the peripheral receptors into the sensorimotor cortex and in identifying in other parts of the brain and brain stem, neurons and groups of cells which respond to somesthetic stimulation. Sensory feedback and control are under investigation, and important revelations of perceptual processes especially in vision and hearing are being published. GRA

**N76-14798#** Federation of American Societies for Experimental Biology, Bethesda, Md Life Sciences Research Office

**NEURAL INTEGRATION IN LEARNING AND MEMORY A HYPOTHESIS**

Sven A. Bach Apr 1975 37 p refs

(Contract F44620-74-C-0077, ARPA Order 2808, AF Proj. 6813)

(AD-A013854, AFOSR-74-1123TR) Avail NTIS

Presented is a hypothesis concerning neural integration in learning and memory based on biochemical events in this time domain. The hypothesis suggests that one of the events involved in intraneuronal message transfer may be pumping of lattice-vibrational states by signals pulsed to match the relaxation time of such states. The energy levels attainable can in turn match those required for conformational changes in macromolecules. Intracellular processes may play an equal or larger role in neural functioning than events measurable across the cell-membrane. The hypothesis provides a basis for study of early time-variable concentrations of metabolic intermediates, metabolites and secretory products of neurons during memory and learning. GRA

**N76-14799#** Carnegie-Mellon Univ., Pittsburgh, Pa Dept. of Computer Science

**A NEW TIME-DOMAIN ANALYSIS OF HUMAN SPEECH AND OTHER COMPLEX WAVEFORMS Ph.D. Thesis**

Janet MacIver Baker May 1975 159 p refs

(Contract F44620-73-C-0074, ARPA Order 2466)

(AD-A013583, AFOSR-75-1083TR) Avail NTIS CSCL 05/7

The purpose of this research is to explore the usefulness of a new time-domain analysis of complex waveforms especially with respect to human speech. Essentially three separate investigations are presented, with the last two predicated on the results of the first. (1) Cycle-based time-domain parameters were extracted from the speech waveforms of many hundreds of utterances and were then subjected to extensive scrutiny both by hand and by machine. (2) Based solely on time-domain phenomena found in the previous study the authors wrote an automatic segmentation program for continuous speech. (3) They examined the time-domain acoustic characteristics of 228 allophones of fricatives and stop consonants, for each of three speakers (2 males, 1 female). Finally, they present a personal view of the synergism inherent in the utilization of these time-domain techniques with the traditional frequency-domain techniques. In addition, suggestions are presented for applying these generalizable time-domain techniques to other complex waveforms, especially amenable to such analysis. Specific examples are drawn from music (e.g. violin) and animal (e.g. bou-bou shriek) vocalizations. GRA

**N76-14800#** Carnegie-Mellon Univ., Pittsburgh, Pa Dept. of Computer Science

**A MODEL OF HUMAN COGNITIVE BEHAVIOR IN WRITING CODE FOR COMPUTER PROGRAMS, VOLUME 1**

Ruven Brooks May 1975 155 p refs

(Contract F44620-73-C-0074, ARPA Order 2466)

(AD-A013582, AFOSR-75-1084TR) Avail NTIS CSCL 05/10

A theory of human cognitive processes in writing code for computer programs is presented. It views behavior in terms of three processes, understanding, planning, and coding. The first of these consists of acquisition of information from the problem instructions and directions. This is used by the planning process to create a solution plan stated as a set of functional specifications in a language which is independent of the syntax of the particular programming language. The coding process converts this plan to code using a process named symbolic execution in which pieces of code are assigned effects expressed in terms of the functions the programmer intends the code to perform in achieving the purpose of the program. Within the framework of this theory, a more explicit model of the coding process was developed. The model is based on a production system and has been implemented as a computer program. Given plans taken from protocols of a programmer writing a series of short FORTRAN programs it is able to generate the same code in the same order as the programmer did. GRA

**N76-14801#** Massachusetts Inst of Tech, Cambridge Artificial Intelligence Lab

**THE LOW-LEVEL SYMBOLIC REPRESENTATION OF INTENSITY CHANGES IN AN IMAGE**

David Marr Dec 1974 45 p refs  
(Contract N00014-70-A-0362-0005)

(AD-A013669, AI-M-325) Avail NTIS CSCL 06/4

A family of symbols is defined by which much of the useful information in an image may be represented, and its choice is justified. The family includes symbols for the various commonly occurring intensity profiles that are associated with the edges of objects, and symbols for the gradual luminance changes that provide clues about a surface's shape. It is shown that these descriptors may readily be computed from measurements similar to those made by simple cells in the visual cortex of the cat.

Author (GRA)

**N76-14802** Georgia Inst of Tech, Atlanta

**THE MAN-MACHINE TASK ALLOCATION PROBLEM WITH SEQUENCING CONSIDERATIONS** Ph D. Thesis

Robert Lee Bulfin, Jr 1975 145 p

Avail Univ Microfilms Order No 75-26202

Scheduling problems that involve a human as well as a machine component are discussed. Each component of the system must process certain operations of some project but in addition there are other operations that can be performed by either. It is assumed that all operation processing times are sequence independent but do depend on which component processes the operation. Precedence constraints, defined as conditional and absolute, are allowed. A branch-and-bound approach is developed to treat the problem where minimum total completion time is the measure of performance. Suitable computational experience is given. A variation of this problem, called the sequence dependent problem, is also investigated. Dissert Abstr

**N76-14803** Kent State Univ, Ohio

**REAL EAR ATTENUATION OF PERSONAL EAR PROTECTIVE DEVICES WORN IN INDUSTRY** Ph D Thesis

Donald E Regan 1975 163 p

Avail Univ Microfilms Order No 75-27823

The principal purpose of this investigation was to determine if manufacturers' attenuation specifications realistically reflect the actual attenuation provided by protective devices when worn by industrial employees in the work place. The differences in attenuation, if any existed between various makes and models of protective devices were also investigated. Results indicate that attenuation provided to the worker is significantly less than manufacturers' specifications. All ear protectors' attenuation was not only significantly less than manufacturers' data, but was also below the low-fence requirements suggested by SACON.

Dissert Abstr

**N76-14804\*** National Aeronautics and Space Administration Lyndon B Johnson Space Center, Houston, Tex

**AUTOMATIC BIOWASTE SAMPLING** Patent

G L Fogal (GE Philadelphia) and Richard L Sauer inventors

(to NASA) (GE, Philadelphia) Issued 28 Oct 1975 8 p Filed 22 Nov 1974 Supersedes N75-13536 (13 - 04, p 0458) Sponsored by NASA

(NASA-Case-MSC-14640-1, US-Patent-3,915,012,

US-Patent-Appl-SN-526449, US-Patent-Class-73-421R,

US-Patent-Class-128-2F) Avail US Patent Office CSCL 06B

A solids biowaste sampling system for use under space flight conditions is described. The sampling system is comprised of a storage container, a seat, and a tissue bypass which permits passage of a waste sample to a slinger assembly or delivery of tissue directly into the interior of the storage container. The slinger assembly has a rotating platform which radially distributes the biowaste materials transverse to the vertical in a shredded form. The biowaste material is collected by a sampling strip for retention and examination.

Official Gazette of the U S Patent Office

**N76-14805\*#** Southwest Research Inst, Houston, Tex  
**STUDY OF VOLATILE CONTAMINANTS IN RECLAIMED WATER** Final Report

Herbert C McKee, John D Millar, and N F Swynnerton Oct 1975 40 p refs

(Contract NAS9-12843)

(NASA-CR-144636 SwRI-01-3391-001) Avail NTIS HC \$4.00 CSCL 06K

Different methods were evaluated for reducing the volatile contaminants found in water recovered from urine by distillation. The use of activated carbon, addition of potassium permanganate, and the use of oxidation catalyst are described along with laboratory tests. It is concluded that catalytic decomposition appears to be feasible and further investigation is recommended. F O S

**N76-14806\*#** Missouri Univ, Columbia

**MULTIPLE NUTRIENT MARKERS ENERGY AND NUTRIENT** Final Report

T D Luckey, B Venugopal, and D P Hutcheson 1975 139 p refs

(Contract NAS9-12369)

(NASA-CR-144635) Avail NTIS HC \$6.00 CSCL 06K

A passive system to determine the in-flight intake of nutrients is developed. Nonabsorbed markers placed in all foods in proportion to the nutrients selected for study are analyzed by neutron activation analysis. Fecal analysis for each marker indicates how much of the nutrients were eaten and apparent digestibility. Results of feasibility tests in rats, mice, and monkeys indicate the diurnal variation of several markers, the transit time for markers in the alimentary tract, the recovery of several markers, and satisfactory use of selected markers to provide indirect measurement of apparent digestibility. Recommendations are provided for human feasibility studies. Author

**N76-14807\*#** Quantum Dynamics, Tarzana, Calif Advanced Experimental Research and Instrumentation

**DEVELOPMENT OF A HIGH-RESOLUTION AUTOMATIC DIGITAL (URINE/ELECTROLYTES) FLOW VOLUME AND RATE MEASUREMENT SYSTEM OF MINIATURE SIZE** Final Report

Frederick F Lu 20 Aug 1975 43 p

(Contract NAS9-14433)

(NASA-CR-144646) Avail NTIS HC \$4.00 CSCL 06K

To aid in the quantitative analysis of man's physiological rhythms, a flowmeter to measure circadian patterns of electrolyte excretion during various environmental stresses was developed. One initial flowmeter was designed and fabricated; the sensor of which is the approximate size of a wristwatch. The detector section includes a special type of dielectric integrating type sensor which automatically controls, activates, and deactivates the flow sensor data output by determining the presence or absence of fluid flow in the system, including operation under zero-G conditions. The detector also provides qualitative data on the composition of the fluid. A compact electronic system was developed to indicate flow rate as well as total volume per release or the cumulative volume of several releases in digital/analog forms suitable for readout or telemetry. A suitable data

readout instrument is also provided Calibration and statistical analyses of the performance functions required of the flowmeter were also conducted Author

**N76-14808\*#** Life Systems, Inc Cleveland Ohio  
**ZINC DEPOLARIZED ELECTROCHEMICAL CO2 CONCENTRATION Final Report, Feb - Oct 1975**  
R R Woods, R D Marshall, and F H Schubert Oct 1975 60 p refs  
(Contract NAS2-6478)  
(NASA-CR-137731 ER-267-3) Avail NTIS HC \$4 50 CSCL 06K

Two zinc depolarized electrochemical carbon dioxide concentrator concepts were analytically and experimentally evaluated for portable life support system carbon dioxide (CO2) removal application The first concept, referred to as the zinc hydrogen generator electrochemical depolarized CO2 concentrator, uses a ZHG to generate hydrogen for direct use in an EDC The second concept referred to as the zinc/electrochemical depolarized concentrator, uses a standard EDC cell construction modified for use with the Zn anode The Zn anode is consumed and subsequently regenerated thereby eliminating the need to supply H2 to the EDC for the CO2 removal process The evaluation was based primarily on an analytical evaluation of the two ZnDCs at projected end item performance and hardware design levels Both ZnDC concepts for PLSS CO2 removal application were found to be noncompetitive in both total equivalent launch weight and individual extravehicular activity mission volume when compared to other candidate regenerable PLSS CO2 scrubbers

Author

**N76-14809\*#** Life Systems, Inc Cleveland, Ohio  
**ELECTROCHEMICAL CARBON DIOXIDE CONCENTRATOR ADVANCED TECHNOLOGY TASKS Final Report, 1 Jul 1973 - 25 Aug 1975**  
J J Schneider, F H Schubert, T M Hallick and R R Woods Oct 1975 137 p refs  
(Contract NAS2-6478)  
(NASA-CR-137732 ER-170E-4) Avail NTIS HC \$6 00 CSCL 06K

Technology advancement studies are reported on the basic electrochemical CO2 removal process to provide a basis for the design of the next generation cell, module and subsystem hardware An Advanced Electrochemical Depolarized Concentrator Module (AEDCM) is developed that has the characteristics of low weight, low volume high CO2, removal good electrical performance and low process air pressure drop Component weight and noise reduction for the hardware of a six man capacity CO2 collection subsystem was developed for the air revitalization group of the Space Station Prototype (SSP)

Author

**N76-14810#** Hughes Aircraft Co Culver City Calif Display Systems and Human Factors Dept  
**BINOCULAR RIVALRY IN HELMET-MOUNTED DISPLAY APPLICATIONS Final Technical Report, Apr 1973 - Aug 1974**  
M L Hershberger and D F Guern Jun 1975 146 p refs  
(Contract F33615-73-C-4145, AF Proj 7184)  
(AD-A013838, HAC-P74-417R, HAC-Ref-C7622  
AMRL-TR-75-48) Avail NTIS CSCL 05/8

A research program was conducted to determine the relationships between helmet-mounted display (HMD) design parameters and binocular rivalry A screening study which investigated 12 parameters was then conducted to determine which parameters affected binocular rivalry with HMDs A parametric study was next conducted to establish functional relationships between HMD parameters and binocular rivalry for the parameters identified in the screening study to have a major impact on binocular rivalry The final laboratory study was a validation study which compared selected HMD system configurations in realistic HMD and non-HMD tasks for binocular rivalry effects The image quality analysis evaluated the effects of ambient illumination display luminance, combiner transparency and angular display subtense on HMD video image quality using modulation transfer function analysis techniques GRA

**N76-14811#** California Univ Los Angeles School of Engineering and Applied Science  
**BIOCYBERNETIC CONTROL IN MAN-MACHINE INTERACTION Semiannual Technical Report, 1 Jul 1974 - 31 Jan 1975**

Jacques J Vidal and Marshall D Buck Mar 1975 60 p refs  
(Contract N00014-69-A-0200-4055 ARPA Order 2816)  
(AD-A013649 UCLA-ENG-7535) Avail NTIS CSCL 06/4

The research program aims at incorporating EEG 'evoked responses' in man-machine communication A methodology for the real-time discrimination of evoked responses by a computer in real-time has been developed Extremely high rates of sensory stimulus identification from EEG have been achieved The experimental paradigm has been completely implemented on the laboratory computer system Experiments are now in progress that involve the EEG discrimination algorithm in an actual man-machine communication procedure GRA

**N76-14812#** IBM Federal Systems Div Gaithersburg, Md  
**PROGRAM DOCUMENTATION FOR THE PHASE 6 EWO CREW STATION SIMULATION PROGRAMS**

W E Brandt Jr and D L Wartluft Jan 1975 57 p refs  
(Contract F33615-72-C-1378)  
(AD-A013848, AMRL-TR-75-22) Avail NTIS CSCL 05/9

The Phase 6 EWO Crew Station Simulation Programs were written to provide a means for studying the performance of a trained electronic warfare officer during an electronic warfare simulation, and to analyze the impact of new equipment and the organization of old equipment on crew performance A real-time program controls and monitors an electronic warfare simulator modified to include a set of equipment changes associated with the project The times at which all input and output transitions occur are recorded for subsequent analysis GRA

**N76-15765\*#** General Dynamics/Convair, San Diego, Calif  
**DEFINITION OF LIFE SCIENCES LABORATORIES FOR SHUTTLE/SPACELAB VOLUME 1 EXECUTIVE SUMMARY**

Dec 1975 51 p  
(Contract NAS8-31368)  
(NASA-CR-144121, CASD-NAS-75-054-Vol-1) Avail NTIS HC \$4 50 CSCL 14B

Research requirements and the laboratories needed to support a Life Sciences research program during the shuttle/Spacelab era were investigated A common operational research equipment inventory was developed to support a comprehensive but flexible Life Sciences program Candidate laboratories and operational schedules were defined and evaluated in terms of accommodation with the Spacelab and overall program planning Results provide a firm foundation for the initiation of a life science program for the shuttle era Author

**N76-15766\*#** General Dynamics/Convair, San Diego, Calif  
**DEFINITION OF LIFE SCIENCES LABORATORIES FOR SHUTTLE/SPACELAB VOLUME 2 LIFE SCIENCES LABORATORY CONCEPT DEFINITION**

Dec 1975 184 p refs  
(Contract NAS8-31368)  
(NASA-CR-144122, CASD-NAS-75-054-Vol-2) Avail NTIS HC \$7 50 CSCL 14B

For abstract, see N76-15765

**N76-15767\*#** General Dynamics/Convair, San Diego, Calif  
**DEFINITION OF LIFE SCIENCES LABORATORIES FOR SHUTTLE/SPACELAB VOLUME 5 LIFE SCIENCES LABORATORY SYSTEM REQUIREMENTS DATA BOOK BOOK 1. SYSTEM REQUIREMENTS. BOOK 2. APPENDICES**

Dec 1975 216 p  
(Contract NAS8-31368)  
(NASA-CR-144123, CASD-NAS-75-054-Vol-5-Bk-1, CASD-NAS-75-054-Vol-5-Bk-2) Avail NTIS HC \$7 75 CSCL 14B

The system requirements of three selected Life Science laboratory concepts are defined for the mission phases of prelaunch launch, on orbit descent, and post landing For Vol 1, see N76-15765 Author

**N76-15768\*** General Dynamics/Convair San Diego, Calif  
**DEFINITION OF LIFE SCIENCES LABORATORIES FOR SHUTTLE/SPACELAB VOLUME 5 LIFE SCIENCES LABORATORY SYSTEM REQUIREMENTS DATA BOOK BOOK 3: PRELIMINARY EQUIPMENT ITEM SPECIFICATION CATALOG**

Dec 1975 319 p  
(Contract NAS8-31368)  
(NASA-CR-144124, CASD-NAS-75-054-Vol-5-Bk-3) Avail  
NTIS HC \$9 75 CSCL 14B

Working data on the equipment items within the Life Sciences Laboratory Common Equipment Inventory are presented For Vol 1, see N76-15765 Author

**N76-15769\*** Savannah State Coll., Ga  
**STUDIES ON THE TOXIC ELEMENTS AND ORGANIC DEGRADATION PRODUCTS IN AQUATIC BODIES AND SEDIMENTS AROUND KENNEDY SPACE CENTER (KSC) HAULOVER CANAL AND MOSQUITO LAGOON Annual Report, Sep 1974 - Sep 1975**

G S Ghuman, M P Menon, and C Obi Emeh Dec 1975  
63 p refs  
(Grant NsG-803)  
(NASA-CR-146079) Avail NTIS HC \$4 50 CSCL 06C

The work during the first year ending September, 1975, is reported Indian River, Haulover Canal, Mosquito Lagoon, and other aquatic areas of discharge around Kennedy Space Center (KSC) were studied The presentation and interpretation of data on water and sediment samples collected from Haulover Canal and Mosquito Lagoon are included The field and laboratory data are presented and tentative conclusions were drawn in the various aspects of the study An attempt was made to correlate the physical chemical, and biological parameters Author

**N76-15770\*** Oakwood Coll., Huntsville, Ala  
**INVESTIGATIONS OF THE INHIBITORY EFFECTS OF TOCOPHEROL (VITAMIN E) ON FREE RADICAL DETERIORATION OF CELLULAR MEMBRANES Final Technical Report, 1 Jun 1974 - 31 May 1975**

David Richardson 31 May 1975 11 p refs  
(Grant NsG-8017)  
(NASA-CR-146071) Avail NTIS HC \$3 50 CSCL 06C

The inhibitory effects are investigated of d,1-alpha-tocopherol and d,1-alpha-tocopheryl acetate on the free radical deterioration of cellular membranes The level of toxicity of d 1-alpha-tocopherol and d,1-alpha-tocopheryl acetate in mice is determined Author

**N76-15771\*** Cornell Univ., Ithaca NY Water Resources and Marine Sciences Center  
**A COMPUTER PROGRAM PACKAGE FOR AQUATIC ECOLOGISTS**

Paul J Godfrey, Lois White and Elizabeth Keokosky Apr 1975  
54 p refs Sponsored in part by Rockefeller Foundation  
(PB-244508/8, TR-95, W75-10908 OWRT-A-047-NY(2))  
Avail NTIS HC \$4 50 CSCL 06C

Several computer programs developed to meet the specialized needs of data common to aquatic ecology are presented These programs are useful for data reduction and arrangement, and several were designed to produce output for subsequent use in available statistical program packages The programs are classified into three groups (1) generalized programs applicable to many forms of limnological data--INTEGRATE and AVERAGE (2) specialized programs for chemical data--CO2 and D O SAT, and PIGMENT RATIO, and (3) specialized programs for biological data--SPECIES, and SUCCESSION The programs are written in FORTRAN IV, except for SPECIES which is written in PL/1 All were run on an IBM 360 and IBM 370 but conversion to

other systems should not be difficult The programs are described in detail and an appendix includes program listings and examples of the outputs GRA

**N76-15772\*** Southwest Research Inst San Antonio, Tex  
**BIOMEDICAL APPLICATIONS TEAM TASKS Final Report, Nov 1974 - Oct. 1975**

Charles J Laenger Sr., Robert L Wilbur, H Herbert Peel, and Sam R McFarland 31 Oct 1975 28 p refs  
(Contract NAS9-13775, SwRI Proj 13-3836)  
(NASA-CR-147407) Avail NTIS HC \$4 00 CSCL 06B

The status of the biomedical applications team is discussed along with its activity in applications engineering Various technology requests are summarized MJS

**N76-15773\*** Battelle Pacific Northwest Labs., Richland, Wash  
**OCCUPATIONAL AND ENVIRONMENTAL SAFETY DEPT  
TOTAL BODY NITROGEN ANALYSIS Final Report, 1 Feb - 31 Oct 1975**

H E Palmer 28 Nov 1975 17 p refs  
(Contract NAS9-14248)  
(NASA-CR-144653) Avail NTIS HC \$3 50 CSCL 06P

Studies of two potential in vivo neutron activation methods for determining total and partial body nitrogen in animals and humans are described A method using the CO-11 in the expired air as a measure of nitrogen content was found to be adequate for small animals such as rats, but inadequate for human measurements due to a slow excretion rate Studies on the method of measuring the induced N-13 in the body show that with further development this method should be adequate for measuring muscle mass changes occurring in animals or humans during space flight Author

**N76-15774\*** Defense Documentation Center Alexandria Va  
**AEROSPACE MEDICINE Report Bibliography, Oct 1958 - Dec 1974**

Jul 1975 295 p refs  
(AD-A012900, DDC/BIB-75/12) Avail NTIS CSCL 06/5

The bibliography contains unclassified-unlimited citations on Aerospace Medicine It also includes some pertinent information on space biology Some aspects discussed in this report are weightlessness, acceleration tolerance hygiene, behavior diet, life support, stress physiology circulatory systems and respiratory systems Four computer-generated indexes are provided GRA

**N76-15775\*** Naval Medical Research and Development Command, Bethesda, Md  
**ELECTROMAGNETIC RADIATION PROJECT OFFICE**

**COMPILATION OF NAVY SPONSORED ELF BIOMEDICAL AND ECOLOGICAL RESEARCH REPORTS, VOLUME 1**  
Feb 1975 747 p refs

(AD-A015068, EMPRO-2-Vol-1) Avail NTIS CSCL 06/18

This volume is one of several, which combined in a compilation of all research reports and papers to date, describe the extremely low frequency (ELF) research performed under the Sanguine Biological-Ecological Research Program It includes all final reports, technical reports, and papers written by the investigators who performed the research Each document appearing in these volumes was printed from an unedited copy of the investigator's report or from an unedited copy of a paper written by the investigator No attempt was made to summarize the investigator's results GRA

**N76-15776\*** Naval Medical Research and Development Command, Bethesda, Md  
**ELECTROMAGNETIC RADIATION PROJECT OFFICE**

**COMPILATION OF NAVY SPONSORED ELF BIOMEDICAL AND ECOLOGICAL RESEARCH REPORTS, VOLUME 2**  
Feb 1975 736 p refs

(AD-A015069, EMPRO-2-Vol-2) Avail NTIS CSCL 06/18  
For abstract, see N76-15775

**N76-15777#** National Academy of Sciences - National Research Council, Washington, D C  
**COMPENSATION FORMULA FOR HEARING LOSS**  
 W Dixon Ward Mar 1975 11 p refs  
 (Contract N00014-75-C-0406)  
 (AD-A014487) Avail NTIS CSCL 06/10

The Committee on Hearing, Bioacoustics and Biomechanics (CHABA) was asked by the Bureau of medicine and Surgery of the Department of the Navy to draft this report which would provide a formula for converting the pure-tone audiometric thresholds of federal employees into percentages of binaural hearing impairment Under the restriction that the dollar compensation for the new formula using audiometric frequencies measured at 1,000, 2,000 and 3,000 Hz would be approximately the same for each employee as those computed using the previous formula developed by the American Academy of Ophthalmology and Otolaryngology (AA) which had used the audiometric frequencies of 500, 1,000 and 2,000 Hz, CHABA was not asked to evaluate the dollar importance of hearing loss per se Nor was it asked to evaluate the importance of hearing loss relative to other disabilities, sensory and physical, for which federal employees are compensated  
 GRA

**N76-15778#** Computer Sciences Corp., Wallops Island, Va Field Services Div  
**AIRCRAFT COCKPIT VISION: MATH MODEL**  
 J Bashir Jul 1975 37 p ref  
 (Contract NAS6-2369)  
 (NASA-CR-141406) Avail NTIS HC \$4 00 CSCL 05E

A mathematical model was developed to describe the field of vision of a pilot seated in an aircraft Given the position and orientation of the aircraft, along with the geometrical configuration of its windows, and the location of an object, the model determines whether the object would be within the pilot's external vision envelope provided by the aircraft's windows The computer program using this model was implemented and is described  
 Author

**N76-15779#** National Aeronautics and Space Administration Langley Research Center Langley Station, Va  
**REVIEW OF SUBJECTIVE MEASURES OF HUMAN RESPONSE TO AIRCRAFT NOISE**  
 Jimmy M Cawthorn and William H Mayes Jan 1976 28 p refs Presented at the 3rd Interagency Symp on Univ Res in Transportation Noise, 12-14 Nov 1975  
 (NASA-TM-X-72807, Rept-2630) Avail NTIS HC \$4 00 CSCL 20A

The development of aircraft noise rating scales and indexes is reviewed up to the present time Single event scales, multiple event indexes, and their interrelation with each other, are considered Research requirements for further refinement and development of aircraft noise rating quantification factors are discussed  
 Author

**N76-15780#** Control Data Corp., St Paul, Minn Advanced Systems Div  
**RESULTS OF THE VISUAL DETECTION SIMULATION EXPERIMENT FOR THE EVALUATION OF AIRCRAFT PILOT WARNING INSTRUMENTS (APWI) Final Report**  
 W Graham and V Mangulis Dec 1974 231 p refs  
 (Contract DOT-FA70WA-2263)  
 (AD-A017023/3) Avail NTIS HC \$8 00 CSCL 01/2

Results of an experiment to evaluate Aircraft Pilot Warning Instruments (APWI) in a Visual Detection Simulator (VDS) were reported A high correlation between observations in the simulator and the real world was demonstrated APWI systems with sharp range and altitude cut-offs were simulated, with bearing resolutions of 180 deg, 30 deg, and 2 deg, part of the experiment was run with no APWI at all for comparison The results show that the most critical factor in determining the probability of detection of a target is the time available to the pilot for detection, if the time is long enough the pilot will eventually see it, and if the time is too short even the best of APWI will not help him There was significant variation found among all pilots in their ability to detect targets and extreme differences were found between the best and worst pilots in this respect  
 Author

**N76-15701#** George Washington Univ., Washington, D C  
**PASSENGER COMFORT DURING TERMINAL-AREA FLIGHT MANEUVERS M.S. Thesis**  
 Ward Elliott Schoonover, Jr Jan 1976 124 p refs Sponsored by NASA  
 (NASA-CR-146077) Avail NTIS HC \$5 50 CSCL 05E

A series of flight experiments was conducted to obtain passenger subjective responses to closely controlled and repeatable flight maneuvers In 8 test flights, reactions were obtained from 30 passenger subjects to a wide range of terminal-area maneuvers, including descents, turns, decelerations, and combinations thereof Analysis of the passenger rating variance indicated that the objective of a repeatable flight passenger environment was achieved Multiple linear regression models developed from the test data were used to define maneuver motion boundaries for specified degrees of passenger acceptance  
 Author

**N76-15782#** Office National d'Etudes et de Recherches Aerospatiales, Paris (France)  
**QUESTIONNAIRE THEORY MODELLING OF THE PILOT'S MENTAL LOAD**  
 Dominique Soulatges 1974 33 p refs In FRENCH, ENGLISH summary  
 (ONERA-NT-230) Avail NTIS HC \$4 00

The task carried out by a human operator is modelled, in the form of a robot (in the sense of heuristic programming), and the concept of operator's work load is associated to that of information processed by the robot who takes decisions The interest of the questionnaire theory is to formalize the concept of information processed on a support of graphs similar to the arborescences deployed by a robot The main definition of this theory is presented preceded by a brief survey of information and graph theory concepts necessary to understand them The connection between heuristic programming and the manner in which the questionnaire theory permits the formalization of the informative cost of decision is also established A table of base-2 logarithms of integers up to 100 will make it easier to verify the calculation given as examples  
 Author (ESA)

**N76-15783#** Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bad Godesberg (West Germany) Inst fuer Flugmedizin  
**DEVELOPMENT AND TESTS OF HELIOX DIVES IN EXCESS OF 100 m, PART 1**  
 Pierre Cabarron, Uwe Finkeldey Hans-Dietrich Fust, Horst Krekeler, Karl-Gerhard Mueller, and Heinz Oser 11 Jul 1975 46 p refs  
 (DLR-FB-75-48-Pt-1) Avail NTIS HC \$4 00, DFVLR, Cologne DM 19 20

Possibilities to reduce the necessary decompression time for Heliox dives in the range from 100 to 200 m were investigated The type m-profile with a medium pressure reduction and a long decompression time and the type f-profile with a fast pressure reduction and a short decompression time were considered Except for the initial decompression phase the delta P-values of the f-profile are smaller than those of the m-profile An analysis of available diving information leads to new type f-profiles 110/60, 135/60 and 150 m/30 min Heliox-dives were proposed and tested in a dry chamber and a wet pot During the test of unsuccessful profiles, which had to be rejected, only slight decompression type I sickness symptoms occurred, neither vestibular nor central nervous symptoms were noticed A series of profiles for 135/60/428 and 150 m/30 min/300 min dives, each slightly modified was successful They may provide a new basis for the introduction of type f-standard tables  
 Author (ESA)

**N76-15784#** Systems Research Labs., Inc., Dayton, Ohio  
**DEVELOPMENT, APPLICATION, AND EVALUATION OF A PROCEDURE FOR QUANTIFICATION OF TECHNOLOGICAL CHANGE IMPACT ON HUMAN RESOURCES Final Report, 3 Dec 1973 - 15 Apr 1975**



Norman R. Potter, Kenneth D. Korkan, and Duncan L. Dieterly  
Jun 1975 48 p refs

(Contract F33615-74-C-4019, AF Proj 7907)

(AD-A014332, AFHRL-TR-75-29(1)) Avail NTIS CSCL 05/5

A multiphased study was conducted to lead to the development of methods for determining the components and measuring the effects of advances in technology on human resources in Air Force weapon systems. The first phase of the study was reported in AD-A000 051. The second phase involved the development of Design Option Decision Trees (DODT) for two areas of Air Force systems technology: Digital Avionics Information System (DAIS) and Remotely Piloted Vehicle Systems (RPV). The third phase called for the development of unique methods or synthesis of existing techniques to result in a new method for measuring the effects of technology on Air Force human resources. A method integrating the DODT with a modification of the method of summated ratings was developed to arrive at a quantification of human resource effects of technological innovations. This procedure was applied (AD-A014335) to the DODT to provide the source data for the evaluation of the developed method. The DODTs for DAIS are presented in AD-A014333. GRA

**N76-15785#** Systems Research Labs, Inc., Dayton, Ohio  
**DIGITAL AVIONICS INFORMATION SYSTEM DESIGN  
OPTION DECISION TREES** Interim Report, 3 Dec 1973  
15 Apr 1975

Norman R. Potter, Kenneth D. Korkan, and Duncan L. Dieterly  
Jun 1975 49 p refs

(Contract F33615-74-C-4019, AF Proj 7907)

(AD-A014333, AFHRL-TR-75-29(2)) Avail NTIS CSCL 05/5

The DODTs for a DAIS system were developed to determine the decision points in a design process which may be of importance in projecting the input of new technology on human resource parameters. The DODTs for the DAIS system were refined through the process of extensive reevaluation by experts in the field both in industry and the Air Force. They were then used in another phase of the study to actually determine the design choice impact on selected human resource parameters. The DODT technique allows for a rather extensive evaluation of the design choices for the completion of a total system. In addition to the major purpose of the DODTs for this research project, as a tool for assisting in quantifying human resource requirements of various technologies, they may be used for a series of other management actions. GRA

**N76-15786#** Johns Hopkins Univ., Baltimore, Md. Dept. of Psychology

**PERCEPTION AND ATTENTION**

Howard E. Egeth 15 Aug 1975 18 p refs Submitted for publication

(Contract N00014-67-A-0163-0012, NR Proj 197-017)

(AD-A014215 TR-81) Avail NTIS CSCL 05/10

The paper provides the reader with an up-to-date account of the empirical and theoretical status of the concept of attention. The emphasis in this review is on the properties of attention that are manifested in studies of human perceptual processes. GRA

**N76-15787#** Naval Air Development Center, Warminster, Pa. Crew Systems Dept.

**INFLUENCE OF VARIOUS ACCELERATION ENVIRONMENTS ON THE ABILITY TO ACTIVATE CONTROLS FOR EMERGENCY DEVICES**

Emma Fessenden 17 Jul 1975 25 p refs  
(WF41451402)

(AD-A014545, NADC-75079-40) Avail NTIS CSCL 06/7

A series of experiments were performed which used the performance ability of aircrewmembers in activating emergency devices to develop test and evaluation methods for emergency control devices under acceleration environments. Environments of realistic emergency situations were dynamically simulated in the human centrifuge. The interaction between various devices and their location with the environment was analyzed. Anthropometric

correlation with failure to activate the emergency control device is given. The method of analyses is described and results of the experiments are presented. Author (GRA)

**N76-15788#** Catholic Univ. of America, Washington, D.C. Human Performance Lab

**STRUCTURAL COMPONENTS IN THE PERCEPTION OF SIXTEEN COMPLEX SOUNDS**

James H. Howard, Jr. and Eugene B. Silverman 1 Aug 1975 45 p refs

(Contract N00014-75-C-0308, NR Proj 197-027)

(AD-A014133, TR-75-1-ONR) Avail NTIS CSCL 05/10

The INDSCAL multidimensional scaling model was used to investigate the distinctive features involved in the perception of sixteen complex non-speech sounds. The signals differed along four physical dimensions: fundamental frequency, waveform, formant frequency, and number of formants. Scaling results indicated that subjects' similarity ratings could be accounted for by three psychological or perceptual dimensions. A statistically reliable correspondence was observed between these perceptual dimensions and the physical characteristics: fundamental frequency, waveform, and a combination of the two formant parameters. These results were further explored with Johnson's (1967) hierarchical clustering analysis. Large differences in featural saliency occurred in the group data with fundamental accounting for more variability than the remaining dimensions. Further analysis of individual subject data revealed large individual differences in featural saliency. These differences were related to past musical experience of the subject and to earlier findings using similar signals. It was concluded that (1) the INDSCAL model provides a useful model for the analysis of auditory perception in the non-speech mode, (2) featural saliency in such sounds is likely to be determined by an unspecified attentional mechanism. The implications of these findings for tactical sonar operations were discussed. Author (GRA)

**N76-15789#** Human Resources Research Organization, Alexandria, Va.

**MULTIVARIATE EXTRAPOCATION OF TRAINING PERFORMANCE**

James W. Dees and L. Paul Dufilho Jun 1975 149 p refs  
(Contract DAHC19-73-C-0004)

(AD-A014172, HUMRRO-TR-75-16) Avail NTIS CSCL 05/9

The report summarizes the techniques used in gathering and maintaining a data file on most of the Army aviator trainees who have been through the Officer/Warrant Officer Rotary Wing Aviator Course 2C-1981-B/2C-062B-B and the Warrant Officer Candidate Course 2C-062B-C during the period 1 July 1968-31 December 1969. Specific regression analyses dealing with the prediction of student performance in training are furnished, and the methods used to obtain them are described. The equations allow the extrapolation of current training performance to a prediction of (a) the probability that the individual will pass the course, and (b) what his final end-of-course grade will be. A review of the most pertinent literature in the area is included as are frequency counts of a large volume of training data. GRA

**N76-15790#** Quest Research Corp., McLean, Va.

**COMPUTER-AIDED TECHNIQUES FOR PROVIDING OPERATOR PERFORMANCE MEASURES** Final Report, Jul 1972 - Aug. 1974

Edward M. Connelly, Francis J. Bourne, Diane G. Loental, and Patricia A. Knoop Dec 1974 85 p refs

(Contract F33615-72-C-2094, AF Proj 6114)

(AD-A014330, AFHRL-TR-74-87) Avail NTIS CSCL 05/9

This report documents the theory, structure, and implementation of a performance measurement processor (written in FORTRAN IV) that can accept performance demonstration data representing various levels of operator's skill and, under user control, analyze data to provide candidate performance measures and validation test results. The processor accepts two types of information: (1) Sample performance data on magnetic tape, and (2) User information reflecting knowledge about features of the performance that are considered to be important to measurement. The sample performance data input is smoothed.

by the processor in order to remove or reduce noise factors in accordance with information provided by the user. Criterion performance functions are optionally, provided by the user or are computed by the processor using skilled performers' data. The processor then develops a discrete representation of the continuous performance data based on observed deviations from the criterion functions. Candidate performance measures are generated by operating on the vectors with multiple regression algorithms. Empirical validation tests of several types are applied to the candidate measures for assessment of their validity-likelihood. The processor can be applied to measurement problems where the human operator working with his equipment obtains demonstrations of various levels of performance. These potential applications include those situations where criterion performance cannot be quantitatively predefined and/or the existing definitions are ambiguous. GRA

**N76-15791#** Quest Research Corp., McLean, Va  
**CANDIDATE T-37 PILOT PERFORMANCE MEASURES FOR FIVE CONTACT MANEUVERS** Final Report, Jul 1972 - Aug 1974

Edward M. Connelly, Francis J. Bourne, Diane G. Loental, Joseph S. Migliaccio, and Duane A. Burchick. Dec 1974. 87 p. refs (Contract F33615-72-C-2028, AF Proj 6114) (AD-A014331, AFHRL-TR-74-88) Avail NTIS CSCL 05/9

The objective of this program was to develop candidate pilot performance measures for five undergraduate pilot training (UPT) contact training maneuvers flown in the T-37B aircraft. The work included development and application of a method of analyzing operator performance tasks for purposes of identifying candidate measures. This resulted in sectoring of each T-37B maneuver into functional segments, wherein the dominant measurement variables are consistent, and task segments, wherein the relationships among the dominant measurement variables are consistent. Several types of measures were then defined which, collectively, satisfy measurement needs over all task segments. Specific candidate measurement formulae were developed for each segment in accordance with the analysis results. Computer programs (FORTRAN IV) were developed and implemented to: (1) Smooth, print out, and plot data recorded on-board a T-37B aircraft, (2) Automatically detect task segment boundaries, (3) Compute criterion functions from skilled performer's data, (4) Compute measures specified at run-time by the user, and (5) perform and print results of several empirical validation tests of the candidate measures for subsequent researcher analysis. Author (GRA)

**N76-15792\*#** National Aeronautics and Space Administration  
 Lyndon B. Johnson Space Center, Houston, Tex  
**HIGH VISIBILITY AIR SEA RESCUE PANEL** Patent Application

Jack Naimor and Mathew I. Radnofsky, inventors (to NASA)  
 Filed 17 Dec 1975. 10 p.

(NASA-Case-MSC-12564-1 US-Patent-Appl-SN-641862) Avail NTIS HC \$3.50 CSCL 05H

A system for air sea rescue utilizing a thin film large area, easily deployable, highly visible, buoyant panel which is formed of a substrate having a specific gravity less than sea water and impregnated with a brilliant fluorescent pigment is described. The panel may be accordion folded for compactness and ease of deployment, may have an inflatable periphery to enhance deployment, rigidity, and buoyancy and may include means for attachment to a flotation device. NASA

**N76-15793#** Unilever Research, Vlaardingen (Netherlands)  
**THE FILTRAGOMETER: A NEW DEVICE FOR MEASURING PLATELET AGGREGATION IN VENOUS BLOOD OF MAN**  
 G. Hornstra and F. TenHoor. [1974]. 40 p. refs. Revised. Submitted for publication. Avail NTIS HC \$4.00

A device for the direct assessment of spontaneous platelet aggregation in human venous blood is described. The principle of the method is based on measurement of the pressure difference across a filter with pores of 20 micron diameter through which

blood from a forearm vein is drawn. Platelet aggregates, obstructing the filter, cause a change in the pressure difference which is proportional to the degree of platelet aggregation. Platelet aggregation as measured with the filtragometer depends on the type of anticoagulant used. The filtragometer response decreases on inhibition of platelet stickiness in vitro by prostaglandin E and in vivo by aspirin ingestion. Moreover, it appeared to be higher in a group with a high thrombosis tendency than in a group less susceptible to fatal arterial thrombosis. The filtragometer seems especially useful in monitoring the results of diet and/or drug therapy. Author (ESA)

**N76-15794#** Naval Research Lab., Washington, D.C.  
**EVALUATION OF MATERIALS FOR MANNED VESSELS TO ASSURE HABITABLE ATMOSPHERES** Final Report

Frederick W. Williams and Homer W. Carhart. Aug 1975. 18 p. refs (AD-A014410, NRL-MR-3091) Avail NTIS CSCL 13/10

Materials used for construction, upkeep, and routine operations of submersibles, undersea chambers, and diving complexes must be considered in view of their potential to pollute the atmosphere. Two preliminary tests, flammability and outgas, are used to initially screen materials. More extensive testing of materials is accomplished with a thermal gravimetric apparatus used in conjunction with gas chromatography and mass spectrometry to measure the chemicals given off by a material under thermal stress from 70 to 400°C. GRA

**N76-15795#** Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio

**REVIEW OF THE OPERATIONAL EFFICACY OF USAF FLIGHT HELMETS IN CRASH AND ESCAPE ENVIRONMENTS**

James W. Brinkley. Aug 1975. 15 p. refs (AF Proj 7231)

(AD-A014263, AMRL-TR-75-74) Avail NTIS CSCL 06/17

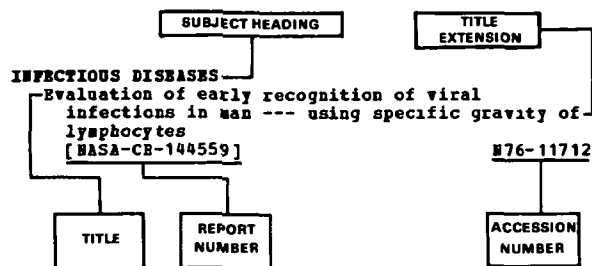
A review of available statistics from aircraft ejections and crashes was conducted to evaluate the efficacy of USAF flight helmets. The review was presented to the fifteenth meeting of Working Party 61 of the Air Standardization Coordinating Committee held in Auckland, New Zealand. The report concentrates on the analysis of data obtained from reports of accidents that occurred during the period of 1 January 1968 to 31 December 1972. Helmet loss rates are compared to the type of helmet, helmet suspension system, use of visor, use of chin or nape strap, airspeed, and aircraft type. Author (GRA)

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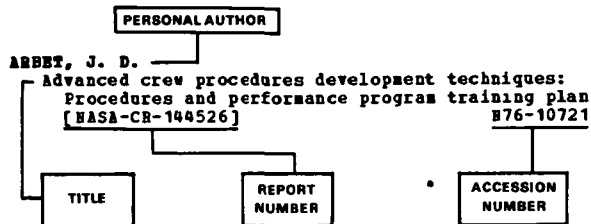
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1. Report No. NASA SP-7011 (153)		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle AEROSPACE MEDICINE AND BIOLOGY A Continuing Bibliography (Supplement 153)				5. Report Date April 1976	
				6. Performing Organization Code	
7. Author(s)				8. Performing Organization Report No.	
9. Performing Organization Name and Address National Aeronautics and Space Administration Washington, D. C. 20546				10. Work Unit No.	
				11. Contract or Grant No.	
12. Sponsoring Agency Name and Address				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract  <p style="text-align: center;">This bibliography lists 175 reports, articles, and other documents introduced into the NASA scientific and technical information system in March 1976.</p>					
17. Key Words (Suggested by Author(s)) Aerospace Medicine Bibliographies Biological Effects				18. Distribution Statement  Unclassified - Unlimited	
19. Security Classif. (of this report) Unclassified		20. Security Classif (of this page) Unclassified		22. Price* \$4.00 HC	
		21. No. of Pages 62			

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